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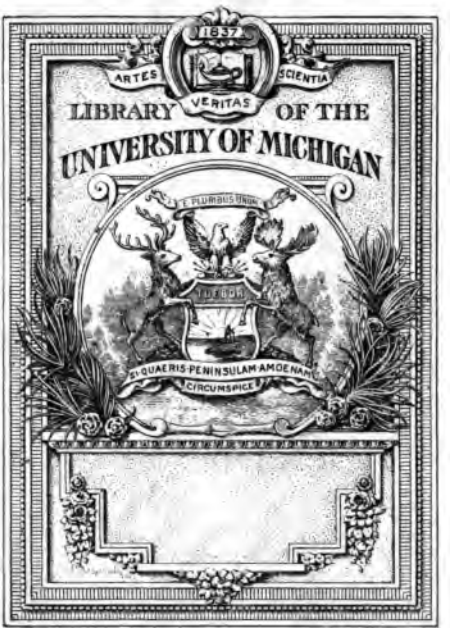
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TREE PLANTING,

FORESTRY IN EUROPE,

AND OTHER PAPERS.

BY

B. G. NORTHROP,

SECRETARY OF CONNECTICUT BOARD OF EDUCATION.

NEW HAVEN:
TUTTLE, MOREHOUSE & TAYLOR.
1880.

TREE PLANTING,

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Public interest in home and rural adornment is rapidly increasing in Connecticut, where some fifty associations for Village Improvement have been already organized. A little foresight will show that no community can afford to be without such an association. This good work should go on till not a school house, dwelling or street is left without the simple and grand adornment of shade trees, or shrubbery, vines, flowers or lawn. In many towns such organizations have already done incalculable good in promoting public health, cultivating public spirit, quickening social and intellectual life, and enhancing the value of real estate. I shall be happy to coöperate with public-spirited citizens who are moving in this matter, and will lecture on this subject without charge either for services or expenses in any town in Connecticut. Tree-planting, both economic and ornamental, commands new attention year by year. These papers, reprinted from an official Report, retain a few local allusions to show the original aim of the writer and the application of kindred plans and principles to other fields.

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ECONOMIC TREE-PLANTING.

BY HON. B. G. NORTHROP.

Being neither a scientist nor farmer, I have made no original investigations or practical experiments in forestry. Lest I may seem presumptuous in attempting to instruct others on a great subject in which I am myself a novice, reference is made to my opportunities for learning the matured views of those who, devoting their lives to this study, have made investigations and experiments on a broad scale. Three months of last summer were occupied in visiting "the Foresters," forest schools, and forest plantations of Europe. The letter of Governor Hubbard,* and one from Hon. Wm. M. Evarts, Secretary of State, bespeaking the coöperation of our ministers and consuls, whose aid might be needed, gave free access to all desired sources of information, especially the official "Departments of Forestry," forest schools and their professors, forest plantations, national, communal, or private, and their managers, and the parks and gardens on the Continent and in England. With note-book always in hand, I conferred with numerous authors in this department, as well as practical foresters. Gathering facts from so many experts, and condensing statements from so many sources, it is impracticable in this address to formally quote their language, which I have freely modified and abridged. In addition to the professors of the forest schools visited, and to many diplomatic agents, I

*EXECUTIVE DEPARTMENT, HARTFORD, CONN., June 12, 1877.

I have signed these presents for the purpose of duly accrediting the Hon. B. G. Northrop, of the Board of Education of this State, who is commissioned by said Board to visit the Schools of Forestry and Forest Plantations, and the Industrial Schools of Europe, and report the results of his observations for the benefit of the schools and people of this State, and especially to encourage the reclamation of waste lands by the propagation of trees. I beg to commend Mr. Northrop to the courtesies and co-operation of all persons to whom these presents shall come, and particularly to those who are managers of the institutions above named, and are interested therein. In testimony whereof, I have hereunto set my hand. RICHARD D. HUBBARD.

am especially indebted to Hon. George P. Marsh, the American Minister to Rome, Captain Campbell Walker, Conservator of State Forests in New Zealand, J. C. Brown, LL. D., long Colonial Botanist at Cape of Good Hope, and J. McGregor, Forester of the Duke of Athole, for information given in personal interviews as well as for that derived from their published works.

The literature of forestry, already large, is now rapidly increasing by the coöperation of professors in forest schools, and government officials specially commissioned to investigate different branches of the subject, and many other writers. A German catalogue gives the titles of 1,815 volumes on forestry issued prior to 1842, and the titles of 650 works published in the six years prior to 1876. On an average, over one hundred new books on forestry appear annually in the German language. One of the Spanish Commissioners to the Centennial Exposition, Señor Morera, published a list of 1,126 volumes on forestry in the Spanish language alone.

Little attention has been given in this country to sylviculture. Nature has been wonderfully bountiful in the magnificent forests which once adorned this land, but our people have been recklessly prodigal in wasting this rich inheritance. As if they were the enemies of man, forests have been consumed without a thought of renewing them, and fire has been made to help the axe in destroying what it required ages to produce.

The progress of a nation may be measured to a large extent by its consumption of wood. Extensively as brick, stone, and iron may be substituted for wood in building, and coal used for fuel, the timber demand for purposes of utility and ornament will everywhere increase as civilization advances. The railways are enormous consumers of wood. Says Professor C. S. Sargent: "Supposing the life of a sleeper is seven years, the 85,000 miles of track in the United States consume annually 34,000,000 sleepers, or thirty years' growth on 68,000 acres of the best natural woodlands. At least 125,000 miles of fencing are required to enclose the railroads of the country, costing not less than $43,000,000, with large expenditures for annual

repairs. For the construction of 65,000 miles of telegraph lines in the United States, 2,000,000 trees for poles were required, while the annual repairs must call for 250,000 more." A late Agricultural Report of Illinois says: "The fences of the United States cost more than any other class of property except real estate and railroads; the total amount being estimated at eighteen hundred millions of dollars, with an annual expense of ninety-eight millions for repairs." Desirable as may be live hedges, stone walls or ditches, wooden fences are likely to be long used.

But aside from the need of fencing, and the demands for railway and telegraph companies, there are nearly seventy occupations enumerated in the last United States census which in whole or in part use wood as their raw material for manufacture, employing more than one million of artisans, such as carpenters, cabinet-makers, chair-makers, coach-makers, coopers, boat and ship builders, wheelwrights, manufacturers of brooms, brushes, matches, furniture, agricultural implements, machinery and the like. There are 63,928 establishments manufacturing articles made entirely of wood, employing 393,387 persons, and using materials worth $309,921,403 annually. There are, besides, 109,512 establishments in which wood is an important material, as for example, in pianos, carriages, bridges and ships, employing 700,915 persons, and using materials worth $488,530,844. With these facts before us, there need be no fear of an overproduction of wood. It is estimated that in our whole country over three million acres of wood-growing land are cleared annually, and this usually without any proper plans for reforesting them. Favorably situated as Connecticut is, in the midst of these industries and near the great market centers, and with new calls for exportation, there is sure to be a growing demand for all desirable lumber.

George Peabody, who did so much to encourage schools and learning, originated the motto, so happily illustrated by his own munificent gifts to promote education: "Education—the debt of the present to future generations." We owe it to our children to leave our lands the better for our tillage, and we

wrong both ourselves and them if our fields are impoverished by our improvidence. But much as foresight is admired when its predictions are realized and its achievements made, all history too plainly tells that the mass of men are not easily persuaded to provide for exigencies far in the future. It was more than two centuries after the death of Bernard Palissy, the famous "Potter of the Tuilleries," and after many sad lessons of devastating mountain torrents resulting from excessive forest denudation, before France learned to heed his earnest warning. Expressing his indignation at the folly of such general destruction of the woods he said: "I call it not error, but a curse and a calamity to all France. When I consider the value of the least clump of trees, I marvel at the great ignorance of men who do now-a-days study only to break down, fell and waste the fair forests which their forefathers did guard so choicely. I would think no evil of them for cutting down the woods, did they but replant some part of them again, but they care naught for the time to come, neither reck they of the great damage they do to their children." In 1680, the eminent French statesman, Colbert, said to Louis XIV.: "France will perish for want of wood."

It was not, however, till 1859 and 1860 that stringent laws were passed for the protection of existing woodlands and the formation of new forests. The former of these laws passed the Assembly by a vote of 246 against 4, and the latter with but a single negative voice. The unanimity with which these laws were enacted, though they seriously interfere with the rights of private domain, shows at last the strength of the popular conviction that the protection and extension of forests were matters of national interest and necessity, and would arrest the devastations of mountain torrents and river inundations. The law of 1860 appropriated 10,000,000 francs, at the rate of 1,000,000 a year, in aiding the replanting of woods. In 1865 a bill was passed for securing the soil in exposed localities by grading, and the formation of greensward.

This measure, proved to be beneficial in France, Mr. Marsh highly recommends for adoption in the United States. The leading features of this system are marking out and securing

from pasturage and browsing a zone along the banks of ravines, which is carefully turfed and planted with shrubs and trees; consolidating the scarps of the ravines by grading and wattling and establishing barriers of solid masonry, or more commonly of fascines, or other simple materials across the bed of the stream, and cutting narrow terraces along the scarps. Many hundred ravines, formerly the channels of formidable torrents, have been secured by barriers, and by grading and planting, and the success of the system has far surpassed all expectation. The plan of *circling*, long used in this country, is now adopted in France. This plan prevents the wash of the surface, and provides irrigation by running horizontal furrows along the hill-sides, and thus cheaply securing a succession of small terraces, checking the rapid flow of the surface water, obviating one cause of inundations, and greatly fertilizing the lands thus irrigated.

The evils of widespread forest denudation both as regards climatic changes, *uniform* flow of springs and streams, devastation by mountain torrents, and the exhaustion of once fertile lands, have been long and sadly felt in the Old World. Many rich and fertile countries have become arid wastes when denuded of trees. The Mediterranean coast of Africa is a case in point. Tunis and Algiers were once fertile regions, supporting a dense population. Their decadence is traceable largely to the destruction of their forests. Rentzsch ascribes the political decadence of Spain almost wholly to the destruction of the forests.

Mr. George P. Marsh says: "There are parts of Asia Minor, of Northern Africa, of Greece, and even of Alpine Europe, where causes set in action by man have brought the face of the earth to a desolation as complete as that of the moon, and yet they are known to have been once covered with luxuriant woods, verdant pastures, and fertile meadows; and a dense population formerly inhabited those *now* lonely districts. The fairest and fruitfulest provinces of the Roman empire once endowed with the greatest superiority of soil, climate, and position, are completely exhausted of their fertility, or so diminished in their productiveness as, with the

for the sandy soils in France, is not adapted to the climate of New England. It has been amply tried, and though growing rapidly for a season or two, is likely to winter-kill. But our native pitch pine, and still better the Scotch pine, are specially adapted to sandy barrens.

Daniel Webster planted many pines at Marshfield, and induced farmers in Plymouth and Barnstable counties to try the same experiment. This has been done very extensively by Mr. J. S. Fay, in Falmouth, near Wood's Hole. In visiting Falmouth I was happily impressed with the beauty and remarkable growth of his tree plantations. There, is a tract of over one hundred and twenty-five acres now densely covered with fine trees. When purchased by him, Mr. Fay says, "It was a barren waste, the soil dry and worn out. On a hundred acres there was not a tree of any kind, unless an oak sprang out from the huckleberry bushes here and there, but hardly lifting its head above them. Indeed, when I bought my place in 1853, except a few stunted cedars on Parker's Point and in the swamps, there was not an evergreen tree within three miles of my house, and hardly any tree of any kind in sight of it. It was maintained that trees could not be made to grow there. The seeds sown were of the native pitch pine with some white pine, the Austrian, Scotch, and Corsican pine, the Norway spruce, and the European larch—in all about thirty-five thousand imported plants, and many thousand native pines. As to the kinds which have done the best, the Scotch pine *from the seed*, including *prompt* germination, has proved the best grower, and very hardy. The Norway spruce and English oak have done well. The larch did not start well from the *seed*, but from the nursery or as imported it has grown remarkably. The hardy Scotch pine does finely either from the seed or the nursery. All these imported trees have done better than the native pitch pine. The larches are about forty feet high, and fourteen inches in diameter one foot from the ground. Some Scotch pines from seed sown in 1861, well situated and in good soil, are thirty feet high, and ten inches through, a foot from the ground. As to profits, one thing is sure. The land, originally

poor, has been enriched by the deposit of thousands of loads of leaves upon it, and by the shade afforded, while the soil has been lightened and lifted by the permeation of the roots of the trees; and though no present profit has been yet realized, (which already might have been by sales of the wood,) it should be considered as an investment for future results. Considering the position of my place, on a coast exposed to violent sea winds permeated with salt spray, the vigorous growth and promising appearance of my forest plantations are very encouraging to those more favorably placed. Not only may the destruction of our forests be partially remedied at a cheap cost, but the *waste* and *sterility* of our land by long cultivating be replaced with fertility by the simple process of nature."

The Scotch fir or pine, which Mr. Fay so highly commends, is a native of the Highlands, a hardy tree, and the most rapid grower of all the evergreens suited to our climate—the European larch, a still more rapid grower, being deciduous. It will thrive in the most dissimilar soils and on poorest sands where most other evergreens will not flourish, and makes an excellent wind-break. Its timber is not duly appreciated in this country. In England it is as highly prized as the best Baltic pine, and regarded as superior to our white pine for general purposes. While skeptical on this point, we must at least admit that it is harder, more durable, and more resinous than the white pine. It is light, stiff, and strong, freer from knots than any other fir, easily worked, and well adapted to all kinds of house carpentry. It is extensively used for masts and in naval architecture. In England it yields large quantities of tar, turpentine, and resin. Next to the larch it is the tree most commonly planted in Great Britain. It should be extensively used in Connecticut in reclaiming lands too poor for the larch. It proved a great success in the sandy wastes of Kincorth and Culbin in Scotland, which are now thriving forests.

Among the foresters of largest experience in Europe, I found the planting out system growing in favor, in place of sowing the seed, whether in furrows or broadcast in the fields where

the trees are to remain. If sowing is adopted, the land, except on sand barrens, must be well prepared. The general practice abroad is to sow the seed in beds, as beet or onion beds are prepared with us. The Germans speak of the seedlings while in the nursery beds as "in the school," and this phrase happily suggests how they should be treated. The aim is here to start, harden, and root the young plants in a small area where they can be sheltered with brush or otherwise from the scorching sun, and watered if need be in case of drought.

If the seedlings are to be put out close by the garden, they may be planted direct from the mother bed at the end of one or two years. But when they are to be removed to any distance or planted as forests, they should be *transplanted* at the end of the first or second year and planted for forests one year later. The larch and Scotch pine are usually planted permanently, two years from sowing in beds and one year from the planting, that is three years from the seed. The direction is constantly repeated to let the trees grow up *very thickly for a few years*, as they will at first thin themselves on the theory of the survival of the fittest, and after the fifth year the value of the poles will pay for the further thinning required. When planted, the rows should not be more than three feet apart, and the plants stand two feet apart in the rows, giving some seven thousand to the acre, varying with the kind of trees. At the outset the trees are planted more thickly in Europe than in America.

Will it pay the average farmer of Connecticut to plant trees? Certainly not if early profit is essential. The answer depends on various circumstances, such as the size of one's farm, its soil and situation. But in an ordinary Connecticut farm of from sixty to one hundred acres and upwards, I answer yes. If you are looking ahead and seeking an investment for future profit, "trees will make dollars, for they will grow in waste places where nothing else can be profitably cultivated. A soil too thin and rough for cereals may be favorable for trees. Hillsides and plains exhausted and worn out by the plow have often been reclaimed by planting forests. Ravines too steep for cultivation are the favorite seats of timber, and

wherever a crevice is found in a rocky ledge, the root of a tree will burrow and spread, taking a hold so firm as to defy the storm, and acting mechanically to disintegrate the rock and change its constituent elements into useful products. By the road-side, the river-bank, along the brook, and on the overhanging cliff, a tree may be always earning wealth for its owners, both in our densest settlements and in the waste places of our most valuable lands." In no way can we ultimately enrich Connecticut more than by planting the choicest trees on our exhausted and unproductive lands. In such situations forests will yield a large percentage of profit. This is a duty we owe to ourselves and to our children.

In many positions forests are of great service as wind-breaks; even narrow strips of trees afford a needful shelter to fruit trees and to various crops, as well as a shield to cattle from piercing winds. Evergreens serve best for screens, as deciduous trees are leafless when their shelter is most needed, especially for stock and around farm buildings. The evergreens most suitable for this purpose are the Norway spruce, white pine, Scotch pine, and Austrian pine; and next to these are the American arbor vitæ, hemlock, and spruce. Sheltered orchards are most productive and less likely to lose their fruit prematurely by violent winds, and the farmer with proper wind-screens consumes less fuel in his house and less forage in his stables. Stated in the order of their obvious advantage to individual farmers, the benefits of tree-planting would be, first, direct profit in timber and fuel; second, the reclamation of waste land; third, shelter; fourth, climatic gain and hygienic influence; and fifth, ornamentation.

The climatic influence of forests has been of late the subject of extensive investigation in Europe, and much evidence gathered showing that forest denudation may result in detriment to the health and welfare of a community. The influence of forests on rainfall, climate, and water supply, has been freely discussed in the schools of forestry and in scientific circles. It is not proved that extensive denudation will cause a marked decrease in the *total* rainfall of any large country. While this is still an unsettled question, recent observations in France,

I visited the planted forests of the Duke of Athole—whose estates, beginning near Dunkeld in Scotland, extend forty miles by ten—in company with Captain Campbell Walker, now the Conservator of State Forests in New Zealand, who was long employed in the same service in India. He said he had personally observed the drying up of springs and decrease of the *average* amount of water in some of the mountain forests in India, in which extensive clearing had taken place, and that such clearing had unquestionably lessened the *regular* supply for springs and permanent flow in the streams and rivers. While I was in England, the terrible famine in India resulting in the starvation of over seven hundred and fifty thousand people—more than the entire population of Connecticut and Rhode Island—was a prominent theme of public thought and talk and sympathy. Captain Walker, Dr. J. C. Brown, and other foresters expressed the view that forest denudation, diminishing the springs and lessening the former sources of artificial irrigation, was the leading cause of this terrible calamity. Under the early rule of the East India Company, there was a wide-spread devastation of the forests, and in later years the construction of extensive railway and telegraph lines have created a new demand for timber. Recently the English Government has adopted energetic measures for re-foresting the mountains, and placed the remaining forests under the supervision of competent foresters.

In a paper read to the Vienna Geographical Society in 1875, Herr Wex, Counsellor of State, and Director of the Government Works for the regulation of the flow of the Danube, affirms that in the last fifty years the decrease in the average level or comparison of the highest and lowest flow of the Elbe and Oder has been seventeen inches, the Rhine twenty-four, Vistula twenty-six, Danube at Orsova, fifty-five. These measurements, embracing the greatest flood

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these hills, which were clothed with a dense forest, have been stripped of trees, and what was never heard of before, the stream itself has been entirely dry. Within the last ten years a new growth of wood has sprung up on the land formerly occupied by the old forest, and now the water runs through the year. DR. PIPER—*Trees of America.*

heights, the lowest flow, and the medium average flow, show that the *floods* are unquestionably higher than in former years, and the contrast between the highest and lowest flow is greater, and that these higher floods are no compensation for the diminution of the medium and low flood, and that many manufactories built during the last fifty years have experienced a marked diminution in the water supply of their streams, and steam-engines have been employed to meet the deficiency of water-power, once ample to do the same work.

The cause of this remarkable phenomena lies in the extensive clearing away of the forests, especially in the mountains, where deluges of rain occur more frequently; for, in lands devoid of trees, the rain water sinks less into the soil, but more speedily reaches the brooks, streams, and rivers, and fills and overflows these water-courses, and results in disastrous floods. The correctness of this conclusion is sadly attested by the now frequently recurring inundations in Italy, in the south of France, Hungary, Bohemia, and in many other lands. It may be worthy of inquiry whether the general clearing of the mountain forests around Salisbury, Connecticut, to meet the growing demand for charcoal for the furnaces, had any connection with the desolating flood which occurred in that town four years ago. A resident of Salisbury, whose farm lies near the base of the mountain skirting that town, says that a stream on his land, formerly never failing, has dried up every summer for the last twenty years.

By several learned societies—like the Royal Academy of Science of Vienna, and the Imperial Academy of Science of St. Petersburg—commissioners were appointed to report upon the paper of Wex, and their reports substantially confirm his views, and say: "Forests exercise a beneficial influence which can hardly be estimated too highly in an increased humidity of the air, a reduction of the extremes of temperature, a diminution of evaporation, and a more *regular* distribution of the rainfall, while the injurious effects of their destruction is seen in an alternation of periods of drought at one time with wasting floods at another." The forests serve as storehouses of moisture, both from their leafy canopy which shuts out the

sun, and the myriads, or rather millions, of leaves covering the soil and acting like a sponge, soaking up and retaining the rain and regulating its distribution, while the roots act as vertical drains, favoring infiltration and promoting the descent of the water into the lower strata of the earth, there to nourish the springs.

Among the works of Dr. J. C. Brown on Forestry—the most voluminous writer on this subject in the English language—is one on "*Reboisement* in France," or the replanting of the Alps, the Cevennes, and the Pyrenees, to arrest and prevent the destructive consequences of torrents. He clearly shows from official documents what fearful inundations resulted from the over-clearing of forests, and describes the remedial measures now in progress, which are to extend through many years and to cost over twelve millions of francs. But the loss of property by the terrible inundations in the south of France in 1875 was estimated by the *government* at seventy-five millions of francs, besides the loss of over three thousand lives. This was the work of a single year. The sad lessons of other torrents and other years have now at length led to systematic efforts to re-clothe their mountains.

The benefits that may accrue to our country from the discussion of tree-planting, were strikingly exhibited two hundred and fourteen years ago, when Sir John Evelyn published his celebrated work, entitled, "Sylva; or, a Discourse on Forest Trees and the Propagation of Timber." It was at once received with great public favor, and honored with royal commendation. He had remarkable success in awakening general interest in sylviculture. It was written while he was employed in an entirely different branch of public service, but, as he says, "from an earnest desire to support the credit of the Royal Society, and to convince the world that philosophy was not barely an amusement, fit only to employ the time of melancholy and speculative people, but a high and useful science, worthy the attention of men of the greatest parts, and capable of contributing in a supreme degree to the welfare of the nation." He was one of the founders of the Royal Society, and wrote this book at its special request, and that society

has originated few books in the last two hundred years more useful than this which still survives in its grand results, although his other works on painting, sculpture, architecture, and medals have long since been forgotten. In many ways England has recognized her great obligations to the man who worked so lovingly and effectively for the good of his countrymen.

Disraeli, in his "Curiosities of Literature," fittingly says: "Had Evelyn only composed the great work of his Sylva, his name would have excited the gratitude of posterity. The voice of the patriot exults in the dedication to Charles II, prefixed to one of the later editions, in which he says: 'I need not acquaint your Majesty how many millions of *timber* trees, besides infinite others, have been planted throughout your vast dominions at the instigation of this work, because your Majesty has been pleased to own it publicly for my encouragement.' Surely, while Britain retains her situation among the nations of Europe, the Sylva of Evelyn will endure with her triumphant oaks. It was a retired philosopher who aroused the genius of the nation, and who, casting a prophetic eye towards the age in which we live, contributed to secure our sovereignty of the seas. The present navy of Great Britain has been constructed with the oaks which the genius of John Evelyn planted."

What trees shall we plant in Connecticut? One of the most valuable of our native trees is the white ash, and, all things considered, it is one of the most profitable for planting. Combining lightness, strength, toughness, elasticity, and beauty of grain in a rare degree, it is in great and growing demand for farming tools, furniture, interior finishing of houses and railroad cars, the construction of carriages, for oars and pulley-blocks, and many other purposes. The excellence of our ash is one secret of the preference given abroad to American agricultural implements. It is hardy, will bear the bleakest exposure, is a rapid grower, and attains large size, but will not thrive on poor lands. It is every way superior to the European ash, much as that has been cultivated and lauded abroad. It is now found widely in the nurseries

and young plantations attached to the forest schools of Europe. Director-General Adolfo Di Béranger, President of the Royal Instituto Forestale at Vallombrosa, pointed me to his plantations of *Fraxinus Americana* with a tone which implied that is the tree of which Americans may well be proud.

The ash is a fine ornamental tree for private grounds, public parks, or for the way-side. When planted closely for timber they grow straight and free from low laterals, and early reach a size that makes the thinnings valuable for poles and fencing. Mr. Budd, a tree grower of Iowa, says: "A grove of ten acres thinned to six feet apart, containing twelve thousand trees, at twelve years were eight inches in diameter and thirty-five feet high, the previous thinning paying all expenses of planting and cultivation. Ten feet of the bodies of these trees were worth, for making bent stuff, etc., forty cents each, and the remaining top ten cents, making a total of $6,000 as the profit of ten acres in twelve years, or a yearly profit of $50 per acre." Mr. Edward Norton of Farmington has about sixteen thousand white ash plants, raised from last year's seed, now in rows to be planted next spring. They are very thrifty, and average about one foot in height. Very few of them died during the summer. He has gathered seed enough for about one hundred thousand plants, which he intends to start next spring.

The seeds of the ash are abundant, ripening by the first of October. They may be easily gathered after the first frost. If sown in the fall they should be covered with three inches of straw. If to be sown in the spring the seed may be mixed with damp sand. With all seedlings care should be taken to keep down the weeds. In some of the nurseries connected with the forest schools, I noticed the seed-beds were protected by green bushes during the hottest and dryest part of the summer. For field planting, the land should be plowed and made mellow in the autumn, that the trees may be planted early in the spring. A little over five thousand plants will be required to the acre, where they are set in rows four feet apart, and two feet apart in the

rows. The weeds can be kept down for three years with a cultivator, when the ground will be sufficiently shaded to require no further cultivation.

Connecticut is rich in its variety of native trees, having nearly sixty species, of which about forty are sizable for timber. Among the native trees worthy of cultivation may be named the white ash, white oak, sugar maple, chestnut, hickory, butternut, white pine, willow, and the elm. The latter, when growing under favoring conditions, has been pronounced "the most magnificent vegetable of the temperate zone." Much as the willow has been used as an ornamental tree, its economic value has not been appreciated in this country. The white willow is especially commended by experienced arborists. While most at home in low grounds and beside streams, it is hardy and will grow, though not as thriftily, on dry uplands and in poor soils. Professor William H. Brewer says: "In England, where it is often sixty or seventy feet high in twenty years, there is no wood in greater demand than good willow. It is light, very tough, soft, takes a good finish, will bear more pounding and knocks than any other wood grown there, and hence its use for cricket bats, for floats to paddle-wheels of steamers, and brake-blocks on cars. It is used extensively for turning, planking coasting vessels, furniture, ox-yokes, wooden legs, shoe-lasts, etc. Its charcoal is used for making gunpowder, its bark for tanning, its sprouts for withes and baskets. In some sections of Europe it has been planted from remote times as one of their most valued trees." Starting from cuttings and growing rapidly it can be very easily propagated. Fuller says: "It groweth incredibly fast—it being a by-word that the profit by willows will buy the owner a horse before that by other trees will pay for the saddle." Mr. Sargent says: "As willow timber could be produced far more cheaply than that of any of our native trees, it should soon come into general use here for the purposes requiring lightness, pliancy, elasticity, and toughness—qualities which it possesses in an eminent degree, and for which more valuable woods are now employed. Less than one-third of the willow used in the United States for basket making is produced here,

the remainder being imported from Great Britain, France, Holland, and Belgium, at an annual cost of five millions of dollars. The osier proper, the product of *Salix viminalis* and its allies, can be grown without trouble in any wet, undrained soil, capable of producing little else of value; but the better sorts of basket willow are only successfully produced with careful cultivation on rich, well-drained soil. Under such conditions it is a profitable crop, capable of netting at least $150 a year to the acre, and well worth the attention of our farmers." The experiment of raising willows is worth trying, though I do not anticipate so large profits as Professor Sargent promises.

For the reclamation of our pastures and waste lands abandoned to hard-hack, sumac, and other worthless brush, the European larch deserves to become a favorite. A native of the Alps, Apennines, of the Tyrol and Carpathian Mountains, it is a very hardy tree, and at home in a variety of well-drained soils, especially on rough, rocky, or gravelly ground, and the most rugged ravines. There are in our State large tracts of bleak hill-sides and mountain declivities or summits, now practically worthless, where the larch, thickly planted, would soon choke out brush, weeds, and grasses. As an ornamental tree it grows finely even in deep and rich loam, but its extraordinary qualities for timber may be impaired when grown on the rich prairies of the West or the best lands of the East. When raised under right conditions it combines the two qualities of rapidity of growth and durability of wood more than any other tree. This wood was in high favor with the Romans for the building of ships and bridges. Julius Cæsar spoke strongly of its strength and durability.

Last summer I heard a lumber-man in Venice say that its durability was amply attested there, as most of the houses of the city are built upon larch piles, many of which, though in use for centuries, show no signs of decay. In a large Doge's palace, now used as a hotel, he showed me some very ancient larch window-casings which are still sound. For gondola posts in the canals adjoining the houses the larch is preferred. In wharves and many other positions in England where there

is an alternation of wet and dry with the tide, the larch has stood this most trying test far better than oak. In England it is regarded as the best timber for railway ties. Monville says: "In Switzerland, the larch, as the most durable of woods, is preferred for shingles, fences, and vine-props. These vine-props remain fixed for years, and see crop after crop of vines bear their fruit and perish without showing any symptoms of decay. Props of silver fir would not last more than ten years." Evelyn says: "It makes everlasting spouts and pent-houses, which need neither pitch nor painting to preserve them." Michie affirms that "For out-door work it is the most durable of all descriptions of wood. I have known larch posts that have stood for nearly fifty years." Professor Sargent expresses the opinion that "For posts it will equal in durability our red cedar, while in the power to hold nails it is greatly its superior." The chestnut railway sleeper loses its power to hold iron in about seven years, though the tie itself may not so soon seriously rot. The larch, while it holds iron as firmly as oak, unlike the latter, does not corrode iron.

The Boston & Albany Railway have larch ties in use for sixteen years which are still sound. The president of the Illinois Central Railway, having examined the vast planted forests of larch in Europe and learned its remarkable fitness for railway ties, offers to transport the young plants free of charge to any point on their lines or leased lines, provided they are to be planted in the vicinity of the same. It is, however, an experiment which time alone can determine, whether the larch will retain its durability when planted in the level, deep, vegetable mould of the prairies, with their retentive sub-soil. That it will grow there rapidly and luxuriantly is amply proved, but its history for many centuries shows that elevated lands suit it better than low grounds, and side-hills and mountain slopes better than flats. In the rich river flats of Kew Gardens and in the vicinity of London the larch does not thrive. The specimens found in that remarkable collection of all known trees are puny. The Kew arborist informed me that in the two hundred and seventy acres appropriated to the arboretum, no spot had been found suited to the larch. Mr. James Brown,

an experienced forester of Scotland, attributes the disease, which has of late prevailed in many larch plantations in that country, to planting it, both in the nursery and the field, in uncongenial soil.

No other tree has been planted so extensively in Scotland. It attains maturity long before the oak, and serves well for nearly all purposes for which oak is used. Larch trees thirty years old are sometimes sold for fifteen dollars each, while oaks of the same age are not worth three dollars each. According to Newlands the strength of larch timber is to that of British oak as 103 to 100; its stiffness as 79 to 100; while its toughness is as 134 to 100. As the larch grows erect, with short and slender laterals, it may be planted much thicker than the oak. According to Loudon ten acres of larch will furnish as much ship timber as seventy-five acres of oak. Its large timber yield per acre is one source of its popularity in Britain. It was first planted on the estate of the Duke of Athole, in 1741. Some stately specimens over one hundred and thirty years old may be seen near the cathedral at Dunkeld. Mr. McGregor, the duke's forester, informed me that on this one estate have been planted over twenty-seven millions of larch trees, covering over sixteen thousand acres, some of which was formerly worth only from one to two shillings per acre.

Dr. James Brown says he has seen matured crops of larch of sixty-five years' standing sold for from $750 to $2,000 per acre, when the land was originally worth only from $2 to $4 per acre. Mr. Sargent, director of the Botanic Garden and Arboretum of Harvard College, gives a detailed estimate of the profits of a plantation of European larch of ten acres to last fifty years, calculating the cost for land, fencing, plants, labor, taxes, and interest, and makes the net gain to be $52,282.75, or about thirteen per cent. per annum for the entire fifty years, after retaining the original capital, and he adds: "There are in Massachusetts fully 200,000 acres of unimproved land which could, with advantage, be at once covered with larch plantations, and if so planted their net yield, according to my estimate, in fifty years would be

$1,045,660,000. Supposing that these 200,000 acres will, in the natural course of events, produce, during the same time, one hundred cords of fire-wood to the acre, worth six dollars a cord, amounting to $120,000,000, and subtracting this sum from the net yield of the larch, we have left, as created wealth, the respectable sum of $925,000,000."

Mr. Sargent, however, admits that this is farming *on paper*, and that considerable allowances should be made for such contingencies as fire, tree diseases, insect attacks, and other dangers now unforeseen. Robert Douglas of Illinois, who has had far more experience in larch planting than any other American, writes me that the larch in this country is remarkably free from all disease and insect depredations.

My special aim has been to encourage the recuperation of sterile lands by tree planting. The experiments of thus reclaiming barren tracts, which have been tried on a large scale in many European countries, prove the superiority of the larch for this purpose over all other evergreens, because it is deciduous. Grigor says: "No tree is so valuable as the larch in its fertilizing effects, arising from the richness of its foliage, which it sheds *annually*. The yearly deposit is very great; the leaves remain and are consumed on the spot where they drop." Trees also enrich the soil by a curious chemistry which disintegrates even the rocks, and transmutes their particles into forms of life and beauty. The radicles and rootlets, in their underground laboratory, secrete acids which dissolve the very sands and stones.

The frequency of forest fires is urged as an objection to tree-planting. Here is a real discouragement; but forests are no more likely to be burned than are our barns and dwellings. More property is consumed every year by the burning of stores and houses in this country than by forest fires. This danger, therefore, should no more prevent tree-planting than house-building. But such views need to be spread among all classes of the American people as will produce the general conviction that the interests of all classes are concerned in the protection and conservation of forests. The schools of forestry have made this sentiment wellnigh universal in

Germany, and all classes there appreciate their value and the need of protecting them. Browsing and pasturage in certain limits are prohibited, and yet the forests are not fenced. Simple marks designate where cattle may pasture and where they may not, and an intelligent public sentiment is a better guardian of the national or communal forests than official watchers or national police.

In some portions of Germany the law formerly required every landholder to plant trees along his road frontage. Happy would it be for us if the sovereigns of our soil would make each such a law for himself. Happy, also, if the law of usage, fashion, or interest here, as did the civil law there, required that every young man before he married should plant a tree. In some of our Western States tree-planting by the road-side is encouraged by a bounty from the State treasury, and in the fields by both a bounty and exemption from taxation for a term of years. The law in Minnesota provides that "every person planting, protecting and cultivating forest trees for three years, one-half mile or more along any public highway, shall be entitled to receive for ten years thereafter an annual bounty of two dollars for each half-mile so planted and cultivated, to be paid out of the State treasury; but such bounty shall not be paid any longer than such line of trees is maintained." If I may be pardoned for repeating a personal allusion, the maples which I planted, when a mere boy, before the old homestead in Litchfield county, are now beautiful and stately trees. As I have often said, they have paid me a thousand-fold for the work they cost, and added new charms to that beautiful spot, to which I count it a privilege to make an annual visit. Among the memories of my boyhood, no day has recurred with such frequency and satisfaction as that then devoted to tree-planting. My interest in the subject is due to this incident (or perhaps accident) of my boyhood. I should be thankful if I could help put a similar incident, and an equally grateful experience, into the childhood of our boys of to-day. In this good work may I earnestly bespeak the coöperation of the farmers of Connecticut.

In tree-planting, the economic and ornamental touch at so

many points that the cases are rare where they really diverge. Nothing, for example, can add so much to the beauty and attractiveness of our country roads as long avenues of fine trees. I saw this beautifully illustrated in France, last summer, where, for over a hundred miles on a stretch, the road was lined with trees. In many ways the first Napoleon's interest in arboriculture proved a benefaction to France. No time should be lost in securing the same grand attraction to the highways of Connecticut. Growing on land otherwise running to waste, such trees would yield most satisfactory returns. The shade and beauty would be grateful to every traveler, but doubly so to the owner and the planter, as the happy experience of many Connecticut farmers can testify. A grand work in this direction is already well started. No class can contribute so much to the adornment of our public roads as the farmers. They have already in abundance the very best trees for the roadside, such as the elm, maple, ash, American linden (or bass), oak, and in some localities the walnut. The hard maple will thrive in dry and gravelly soils, while the elm and red maple are specially desirable for moist, low ground. As the maples should be planted twenty-five feet apart, and the elms from forty to fifty, poplars or willows or trees growing rapidly from scions, may be placed between, to be cut down when their statelier neighbors require the room for their full development.

Tree-planting is fitted to give a needful lesson of forethought to the juvenile mind. Living only in the present and for the present, too often youth will sow only where they can quickly reap. A meager crop soon in hand, outweighs a golden harvest long in maturing. Youth should learn to forecast the future as the condition of wisdom. Arboriculture is a discipline in foresight—it is always planting for the future, and sometimes for the distant future. Says Washington Irving, "There is something nobly simple and pure in such a taste for trees. It argues a sweet and generous nature to have this strong friendship for the hardy and glorious sons of the forest. There is a serene majesty in woodland scenery that enters into the soul, dilates and elevates it, and fills it

with noble inclinations. There is a grandeur of thought connected with this heroic line of husbandry. It is worthy of liberal and free-born and aspiring men. He who plants an oak, looks forward to future ages and plants for posterity. He cannot expect to enjoy its shelter, but he exults in the idea that the acorn which he has buried in the earth shall grow up into a lofty pile, and shall keep on flourishing and increasing and benefiting mankind long after he has ceased to tread his paternal fields." It was the trees of his own planting at Sunnyside-on-the-Hudson, more than the beauty of the surrounding landscape, that led Irving to say, "After all my wanderings, I return to this spot with a heartfelt preference for it over all others in the world." It was the simple beauty he had created at Marshfield,—the grassy lawns, the shaded approaches, the hundreds of trees of his planting,—that bound Daniel Webster so strongly to that sequestered spot. The charm of Abbotsford, the grand Mecca of Scotland, comes mainly from its beautiful ivy and shrubbery and the thousands of trees planted by the hand of its illustrious proprietor. Says Sir Walter Scott, "My heart clings to this place I have created. There is scarce a tree in it that does not owe its being to me. Once well planted, a tree will grow when you are sleeping, and it is almost the only thing that needs no tending."

Any wealthy citizens of Connecticut, who desire to become public benefactors, can hardly find a more inviting field for their liberality than by offering prizes for sylviculture. A few thousand dollars placed in the hands of the Connecticut Board of Agriculture would widely stimulate tree-planting, and greatly enrich the State. The Massachusetts Society for Promoting Agriculture, offer three thousand dollars in the following prizes:

First. For the best plantation of not less than five acres, $1,000; for the next best, $600; and for the next best, $400. For these prizes the European larch must be planted, except in Barnstable, Dukes, and Nantucket counties, where the Scotch pine or Corsican pine must be used, as best adapted to sandy plains. Only plantations made on poor, worn-out

land, or that which is unfit for agricultural purposes, and containing at least 2,700 trees to the acre, can compete for these prizes.

Second. For the best plantation of American white ash, of not less than five acres in extent, $600; for the next best, $400. Plantations originally of less than 5,000 trees to the acre, cannot compete for these prizes.

The following directions for tree-planting are condensed from the recommendations given by the trustees of the prize fund. For planting larch and pine, shallow furrows four feet apart should be run one way across the field. Then by planting in the furrows four feet apart each way, 2,720 plants will be required to the acre. On hilly, rocky land which cannot be plowed, it will be only necessary to open with a spade, holes large enough to admit the roots of the plants. *The larch must be planted as early in the season as the ground can be worked.* No other tree begins to grow so early, and too late planting is a common cause of failure. The Scotch and Corsican pines can be planted up to the first of May. The roots should be exposed to the wind and sun as little as possible. Carelessness in this particular is often fatal to the young plants. The trees should be carried to the field in bundles, covered with wet mats, and not be removed till they are required for planting. The roots should be carefully spread out in the holes or furrows prepared for them, and the soil worked among them with the hand, and finally pressed down with the foot. A cloudy or rainy day is especially favorable for this work. All young plantations *must be protected* from browsing animals, the greatest enemies, next to man, to young trees and the spread of forest growth.

If the New York, New Haven & Hartford Railroad reclaim the strip of land bordering their line through the "sand-blow," the example would be a benefaction to the State as a demonstration of what may be accomplished under the most unfavorable circumstances. If that desert can be reclaimed, surely all other barrens in Connecticut may be fertilized by forests. This enterprise will require time, faith, patience, and money. For the first four years the young trees may seem

Francis Skinner, Brookline, a Trustee of Massachusetts Society for Promoting Agriculture. I will receive and transmit orders for any number of trees for plantations in Connecticut to Douglas & Sons, Waukegan, Illinois. By arrangement with them, such orders transmitted through you are subject to fifteen per cent. discount from the catalogue prices, and such orders can be transmitted up to April 1st, except for European larch, for which the closing time will be March 1st. We are filling our Massachusetts orders from Douglas & Sons in preference to importing from England, as they are cheaper when ordered in large quantities, and the chances of their success far greater. American white ash, one or two years old and about one foot high, are from $3 to $5.50 per thousand; European larch from $4 to $8 per thousand. As this duty is undertaken solely from a desire to facilitate tree-planting, and not for the purpose of any personal gain, I cannot be held responsible in any way for the results.

A. W. Holley, Salisbury, Conn.—The consumption of wood in this and surrounding towns has been very great in supplying charcoal to our numerous iron works. Some of the mountains have been stripped of their trees three times within the last century. The second growth was rapid. Each subsequent one has been less vigorous and less rapid. Other varieties, aided by artificial means, such as seeding, placing cuttings, or transplanting the young trees, might soon render our mountains valuable again for the production of forests. Our land-owners have not paid sufficient attention to the propagation of trees. The denudation of the mountains in Salisbury have lessened our streams. In the season of rain there is a more rapid rise and a greater flood than formerly when the forests were standing and the foliage and falling limbs lay quietly covering the earth beneath. Many smaller streams which flowed continuously through the entire season forty or fifty years ago, fail altogether in the summer, and the larger ones are proportionately diminished. Your suggestions in regard to fertilizing our sandy plains are practical, and should be carried out.

Experiments are now in progress to fix the dunes or sand hills which threaten the Suez Canal, by planting the maritime pine and other trees. Last summer I visited the celebrated forest of Fontainbleau, in France, which covers an area of sixty-four square miles. The soil of this wide tract is composed almost entirely of sand, and apparently as dry as the sand plains of Wallingford. Jules Claré, a student of forest science of world-wide fame, says: "The sand here forms ninety-eight per cent. of the earth, and it is almost without water; it would be a drifting desert but for the trees growing and artificially propagated upon it." What has been done with signal success at Fontainbleau shows the practicability of reclaiming the worst deserts that can be found in our State. Many other facts might be cited were it necessary, both from home and foreign fields, to prove the feasibility of this plan of reclaiming sterile lands. If one is to be commended who makes two blades of grass grow where but one grew before, how much more the farmer who makes forests thrive where nothing now grows.

SCHOOLS OF FORESTRY.

The experience of Europe long since demonstrated the value and necessity of "Forest Schools" so numerous on the Continent. As these institutions are unknown in this country, a detailed statement of their aims and character will not only be of interest, but I hope, will help towards the organization of similar schools in America. In connection with either of our Colleges, the endowment of two additional professorships, or even one at the outset, might inaugurate a Department of Forestry. As the applied mathematics and the sciences comprise so large a part of the curriculum of Forest Schools, a Forest Department could very easily and economically be annexed to the Sheffield Scientific School, where the existing cabinets, laboratories and philosophical apparatus could be utilized in forestral instruction. The endowment of such a department would prove a great benefaction to the State and to the country, opening new fields of investigation which would bear directly on the ultimate resources and permanent prosperity of the nation. The conclusions of foreign foresters, though confirmed by the broadest observations and experience in Europe, cannot all be wisely adopted in American Sylviculture. Difference in soil, climate and other conditions, may affect trees in regard to their rapidity of growth, health, durability of timber, texture, elasticity and grain of the wood, and many other qualities. These vital questions can be determined only by careful investigations carried on in each country. The Lombardy poplar, for example, sending out its almost upright laterals from the very ground all along its tall stem, grows beautifully in Italy, and is still a favorite with the Italians as of old with the Romans, who, it is said, gave it the name *arbor populi*. But in New England so many of its branches winter-kill that it soon becomes an unsightly collection of dead limbs.

Another object of my recent visit to the leading schools of Forestry in Europe was to gather the practical plans and suggestions embodied in my paper on "Economic Tree Planting," first published in the Report of the Connecticut Board of Agriculture, and thus help reclaim our ex-

hausted lands by tree planting. As these lands have been abandoned to hopeless sterility, and their reclamation has already been pronounced a visionary and impracticable scheme, I have shown that the experiment of reclaiming vast barrens in France, Germany, Russia, Austria and other European countries, has been tried with conspicuous success. What has been done on so broad a scale and with such grand results in Europe surely can be accomplished in the comparatively narrow barrens of the New England States.

Another purpose of my journey was to do something towards making our youth practical arborists by awakening a love of trees and an interest in their study and culture. From a wide field of observation, I tried to collect such facts as seem fitted to further the work of rural adornment, in which encouraging progress has already been made in our State. A few oral lessons in our schools on rural art, and especially on the beauty, variety and value of trees and the ease and ways of their propagation, would be as good seed sown in good ground bringing forth fruit an hundred fold. Very little time would be required for those school talks which would be sure to inspire an interest in the study and culture of trees, and in the broader subject of rural art and adornment. To all of the teachers of Connecticut inclined to give such instruction in their schools my "Economic Tree Planting" will be sent without charge, at least so long as the thousand copies printed for that purpose may last.

The planting of the Syrian Willow, the supply of which fell far short of the demand, was designed as a *mere beginning*, sure to lead to something more and better, and to interest our teachers and youth in the broad subject of tree-planting. Beautiful as is the weeping willow, I was careful to say "I should greatly prefer to start five thousand elms or maples if it could be done as easily as my five thousand willows seem likely to be stuck in the ground." While regretting that so many applicants should be disappointed, I urge those who failed to get the willow (and I expect the same of all who succeeded), to try the far better plan of planting our common but very beautiful white ash or elm, maple, white oak, tulip, American linden—or the Scotch fir and European larch. I advise our boys also to raise these

trees from the seed which may be easily gathered every autumn.

The Schools of Forestry have exerted a remarkable influence in Germany in diffusing among the people a general and genuine interest in arboriculture. They regard forests as their friends, and understand their climatic influence and economic value in staying spring torrents, preventing summer droughts and supplying lumber and fuel. The Germans have a passion for nature, and love to frequent their beautiful groves and gardens, for parks and woods abound in or near their cities and towns. The rural and suburban adornment, now the pride and glory of so many beautiful towns in Germany, and the fruit of this revived love of arboriculture, is largely due to the influence and literature which have emanated from her Schools of Forestry. Hence the wanton forest fires so common and destructive in America are comparatively unknown in Germany. The forest incendiary would be regarded as a common enemy, like the poisoner of an acqueduct, recklessly destroying that which it is the interest of all to preserve. The Forest Schools have created a healthful public sentiment which constitutes the best possible protection of the woods.

Efforts are now making to organize a Department of Forestry in connection with the University and new Arboretum of Edinburgh. Hitherto Forestry has been little taught in England, and her young foresters have therefore been educated on the Continent. There is a growing conviction of the need of such institutions in England, due largely to the able and persistent exertions of Rev. J. C. Brown, LL.D., to whom I am indebted for many statements given in this paper. The London Journal of Forestry says: "The University of Edinburgh possesses remarkable facilities for the creation of a School of Forestry, which with some slight additions could be easily converted into a thoroughly equipped Forest Department, capable of teaching the science of Forestry in the most complete and efficient manner.* Such an Institution is one of the greatest wants of the age in this country, and no country in the world requires it more. • With India, Canada, Australia, New Zealand and South Africa, not to mention numerous smaller dependencies of the British Empire,

* This language is equally applicable to the Sheffield Scientific School and to several scientific schools in other States.

crying out to us to furnish them with thoroughly educated foresters, to conserve and restore their fast disappearing forests, or to create new ones, it is a standing blot on the institutions of our country that we cannot educate and qualify at home the men who are needed for this important service. Such an institution would be of inestimable value to India and all our colonies, and exert a most beneficent influence on the management and productiveness of our home forests and the rural prosperity of the whole country. The forest wealth of Canada is being rapidly exhausted. The great pine forests on the Ottawa, St. Maurice and Saguenay rivers, with their wonderful net-work of tributary streams, are rapidly disappearing beneath the ruthless ax of the lumberman. All the more accessible parts of these great forests are already cleared of pine timber. That huge tract of forest between the Ottawa and the St. Maurice, which once seemed inexhaustible, is fast disappearing beneath the destroying ax."

Dr. Hooker, Director of the Royal Gardens at Kew, says: "Forestry, a subject so utterly neglected in this country, that we are forced to send all candidates for forest appointments to France or Germany for instruction both in theory and practice, holds on the Continent an honorable, and even a distinguished place, among the branches of a liberal education. In the estimation of the average Briton, forests are of infinitely less importance than the game they shelter, and not long since the wanton destruction of a fine young tree was considered a venial offence compared with snaring a pheasant or rabbit. Wherever the English rule extends, with the single exception of India, the same apathy prevails. In South Africa, millions of acres have been made *desert*, and more are being made desert annually, through the destruction of the indigenous forests; in Demerara the useful timber trees have all been removed from accessible regions, and no thought is given to planting others; from Trinidad we have the same story; in New Zealand there is not now a good Kauri pine to be found near the coast, and the annals of almost every English colony repeat the tale of willful, wanton waste and improvidence. On the other hand, in France, Prussia, Switzerland, Austria, Italy and Russia, the forests and waste lands are the subjects of devoted

attention on the part of the government, and colleges provided with a complete staff of accomplished professors train youths of good birth and education to the duties of State foresters. Nor, in the case of France, is this law confined to the mother country; the Algerian forests are worked with scrupulous solicitude, and the collection of vegetable produce from the French Colonies in the Museum at Paris, shows that their forest products are all diligently explored." The above criticism of the neglect and inaction of England applies equally to America.

One of the oldest and best schools of forestry in Europe is at Nancy, a beautiful city of great historic interest, pleasantly located on the left bank of the Meurthe, and at the base of a long range of wooded and vine-clad hills, about two hundred miles east of Paris. The parks and gardens of the city are finely adorned with trees and shrubbery. The Department of Meurthe, of which it is the capital, owes much of its rare rural beauty to the influence of this celebrated school. Forestry began to be studied as a science in France during the last century, though these investigations were long interrupted by the French revolution and the consequent wars. On the re-establishment of peace this study was resumed, and the School of Forestry was organized at Nancy, which, enlarged and more fully equipped, is now liberally supported. The cabinets, museums, apparatus and appliances of every sort, seemed to me most complete and ample, although the Director informed me that their choicest material was already packed for the Paris Exposition. Instruction is given gratuitously to those who prepare for the State Forest Service, and the importance of this service may be inferred from the fact that the State forests cover an area of nearly three millions of acres, or about the size of Connecticut, with a gross revenue of about seven millions of dollars, or deducting all expenses, a net revenue of over five millions of dollars. The total expense for board, lodging, uniform, instruments and pocket money, is from four to five hundred dollars a year. To "foreign students" a moderate charge is added for tuition. I found a considerable number of English students in attendance here last summer, who are candidates for forest service in India.

The course occupies three years. The daily work requires ten

hours, and fifteen hundred hours must be given to study, each half year. In the Winter Session, from November 1st to May 1st, seventy-five lectures of an hour and a half each are given on forest economy, and the same amount of time is allotted for preparation of the special topic of each lecture, embracing in the course, the exploitation of forests; relation of forests to climate; natural history of different kinds of trees; management of forests; conversion of one form of forest into another; and desirable qualities and defects of woods. The same number of lectures and the same amount of study are devoted to botany—the structure, organs, physiology and geographical distribution of plants. Of the seventy-five lectures devoted to mathematics, twenty are taken up with land-surveying and levelling, fifteen hours are given to the preparation of plans under the direction of a professor, twenty-two hours to elevations in water-colors, the same time to sketches and descriptions of rising grounds and to diagrams and calculations of polygonal figures, and also to elevations and designs in hatchwork. There are also lectures and lessons in road and bridge building, such as may be required in the exploitation of forests; in forest law and in the German language, together with some military instruction and drill, and practice in horsemanship.

In the Summer Session, from May to September, thirty-one days are spent in botanical and professional excursions in the Vosges, the Jura and other mountains, in which are visited forests in all stages of treatment and exploitation, and where the students are required to practice in the mensuration of wood and timber. Six days are allotted to preparing a report of the tour of observation and an herbarium of the plants collected. Seven days in the field and fifteen hours in the study are given to making a diagram with report, full calculations and topographical plan, including levels and a reduced drawing of the same, and one day in each section of the forest visited to a mensuration of a supposed felling and the preparation of an official report of it. Five days of work on the ground are given to the study of an imaginary projected road, and twenty days to making drawings and specifications and estimates relating to embankments, consolidating the scarps of ravines, building barriers of masonry or fascines across the bed of

streams, and cutting terraces along the scarps. Six days are spent in military reconnaissance with reports and sketches, and in competitive rifle-shooting. The examinations occupy twenty-one days, and eighteen are spent as holydays.

In the second year substantially the same topics of an advancing grade are pursued with an equally full course of study and lectures. The season for cutting timber, the ages of different kinds of trees to be felled, the proper time for a revolution or forest crop and its restoration; mineralogy, lithology and the geological features of France; saw-mills and everything relating thereto, are among the additional studies of the third term. In the summer session, twenty-three days are spent in the forests of Meurthe-et-Moselle and of the l'Aine, in the study of the management of fellings formed of mixed timber, and of coppice being converted into timber forest, and fourteen days are allotted to the preparation of reports of these observations. Two days are devoted to land surveying and six to trigonometrical surveys, making a trigonometrical survey of a forest in the environs of Nancy or of the Vosges, reconnoitering the ground, planting signals, measuring a base line and observing the angles. Twelve days are assigned to the preparation of diagrams and calculations of the net-work of angles and a connection of this net-work with the lines on the map of France. Eleven days are given to the study of the saw-mills in the Vosges, five days of work on the ground and six in the class-room are given to preparing a sketch and a description of diagrams of the mechanism of five saw-mills selected as the best specimens found in operation; to experiments in the gauging of water-courses, the effect of water-wheels, and the time required in the work of sawing, and to the general coefficient of waste.

The Winter Session of the third year extends over the five months from November to April, and is designed for advanced students. In addition to some branches already enumerated, zoölogy with especial attention to entomology, the ravages committed by insects upon forests, the means of averting or destroying them and of recovering a forest ravaged by them; the fixation of sand dunes, the reclamation of barren wastes, and the re-foresting of denuded mountains; the geology and

mineralogy of the mountains of France, mountain torrents, their causes and the means of preventing them, the plans of work projected and the works accomplished; the chemistry of vegetation and all that relates to the production and assimilation of atmospherical and terrestrial elements. The Summer Session of the third year, continuing five months from the first of April, is largely occupied with field-work and observations, especially in the study of the oak forests of Central France, the coniferous forests of the Vosges and Jura and the reforested regions of the Alps. During the entire course the field excursions are made under the direction of competent professors, and careful memoirs of these journeys and observations, with sketches, plans and diagrams are always required.

Italy has experienced the disastrous effects of forest denudation, in climatic excesses, in spring torrents and summer droughts, or at least, in the great diminution of the summer streams and rivers—the sources of irrigation. A code of forest laws has lately been passed, for the extension and protection of the national forests, and for the replanting of communal and private woods. The scientific training of professional foresters is found needful to repair the great waste and damage done in previous centuries. The officers charged with the administration of these forest laws are mainly graduates of the Royal Instituto Forestale at Vallombrosa. While in Switzerland, a letter from our Minister at Rome, Hon. George P. Marsh (who had been informed of my errand in Europe), strongly advised me to visit Vallombrosa, and a letter from Mr. Marsh to the Director General, Adolfo di Bérenger, secured every facility for observation and information when I did visit that institution. Founded as an abbey by Pope Alexander II. in 1070, it early became one of the most celebrated monasteries of Italy, if not of the world, remarkable for its romantic situation (vallis umbrosa, or shady valley of the Appenines, nearly six thousand feet above the sea), its great wealth, the extent of its lands and of its grand planted forests. The present magnificent buildings were erected about two hundred and fifty years ago (1637). For centuries this place has been visited by distinguished travelers. Dante delighted to ramble among these magnificent scenes. Mrs. Browning says of Milton:

"He sang of paradise and smiled,
Remembering Vallombrosa."

When penetrating these dense forests and clambering up the steep ascents to the valley summit, I felt the fitness of his familiar words, and familiar they deserve to be with all our youth.

"Thick as autumnal leaves that strew the brooks,
In Vallombrosa, where the Etrurian shades
High over arched, embower.
. . . And overhead up grew,
Insuperable height of loftiest shade,
Cedar, and pine, and fir and branching palm,
A sylvan scene; and as the ranks ascend
Shade above shade, a woody theater of stateliest view."

An hour's ride from Florence by the Arezzo Railway brings one to Pontassieve. Thence a drive of some eight miles by a series of zigzags and through avenues of cypress and mulberry trees, leads to the terminus of the carriage road. Grand and extensive views of the beautiful valley of the Arno (Val d' Arno), open at every turn, with fine vineyards, orchards and highly cultivated fields, here and there protected by long dykes from the river floods which forest denudations on the tributaries of the Arno have occasioned. From the road a foot and mule path of three miles up a steep ascent leads to the ancient monastery. Here were workmen cutting spars for ship building, to be floated down the Arno to Pisa, or into the Mediterranean. These Benedictine monks centuries ago understood well the economic value of tree planting. It is due to their sagacity and foresight that these vast lands are now densely covered with various pines, firs, beech and chestnut. The very position of the trees, standing in exact rows, shows that tree planting on a large scale has here been successfully carried on for centuries. The silver firs, planted around the abbey centuries ago, are now magnificent and stately trees.

The following sketch of this Forest School is condensed from a fuller history given me by Director Bérenger. This monastery was appropriated by the State in 1865, and opened as a Forest School in 1867, though its organization was not completed till nearly two years later. As the snow lies deep for three months on these mountain heights, the school is transferred for four

months, from November to March, to the old castle of the Counts Guidi at Paterno near the base of the mountain, and only twelve hundred feet above the sea. During the remaining eight months the head-quarters are at the high elevation of Vallombrosa. The contrast in the elevations of the two locations favors the maintenance of two distinct arboretums, the one at Paterno showing the vegetation of Southern Italy, and even the tender exotics of the tropics, while on the heights of Vallombrosa are planted the trees of Northern Europe and America as well as of the Alps. Great varieties of pines, firs, larch, ash, chestnut, oak, beech are cultivated in the nurseries for planting on the slopes and heights of the Appenines. The Director expressed special interest in the culture of the Fraxinus Americana—our white ash. The students each have their small nursery lots in which they try their hands in planting and trans-planting various trees, thus uniting theory and practice.

The Institution has its director and five professors, a library containing nearly 2,500 volumes of forest literature; a well furnished chemical laboratory; a meteorological observatory, where the indications of the thermometer, barometer, pluviometer, anemometer, hygrometer and seismometer are regularly recorded; instruments for tree-measuring and surveying and various arboricultural instruments, models of timber slides; timber carts; sections of wood, indigenous and exotic, and objects of natural history relating to forestry. The professors are appointed by the King, on the recommendation of the Minister of Agriculture. The number of pupils admissible is sixty. Besides the common rudiments, candidates for admission must pass an examination in history, natural history, algebra, geometry, physics and chemistry. The students wear the neat uniform of the Institution, which is that of a forest guard, with oak twigs of gold lace on the collar and cap. The discipline is mildly military, the students respond to the call of the trumpet instead of a college bell, cannot leave the precincts without permission, and are liable to confinement for insubordination. The students make frequent and sometimes extensive excursions through the national and communal forests, with the Professor of Natural History, to observe and collect specimens; with the Professor of Mathematics and Surveying, to make plans

and elevations of the surrounding lands, measure the height and girth of trees, calculate the amount of timber, and learn the various methods of management and exploitation of forests, and with Director Bérenger for special exercises in practical forestry. Besides regular lesson trips, a long excursion is made annually to some extensive woods. One of these journeys of observation, occupying a month, extended to Naples during the International Exhibition of Woods used in Ship building, and included the inspection of the leading forests in Southern Italy.

The following is the Curriculum:

FIRST YEAR. *Mathematics*, including Algebra, Geometry and Trigonometry. *Chemistry*—Organic and Inorganic, with experiments. *Natural History*—Botany, Systematic and Vegetable Physiology. *Forestry*—Theoretic and Practical. *Languages*—Italian, German and French, with Reading, Writing and translating of Forest Literature.

SECOND YEAR. *Mathematics applied*—Differential and Integral Calculus, Conic Sections, Measuring Heights of Trees and Cubic Contents, Plan Drawing and Valuation Surveys. *Climatology* and Forest Meteorology. *Natural History*—Botany, Dendrology, Forest Entomology, Geology and Mineralogy. *Forest Economy*—History of Forest Science, Practical Sylviculture, Seasoning of Timber and Exploitation of Forests. *Elements of Agriculture*—Improvement of Soils, Pasturage, Drainage, Agriculture, etc. *Languages*—Exercises in Italian, German and French.

THIRD YEAR. *Mathematics applied*—Rates of Growth of Trees. Mensuration, Preparing Charts and Levels, Estimating Condition and Value of Forests, Forest Administration—Statistics of different Woods, Classification of Forests, Reclamation of Barrens and Wastes, Planting of Sand Dunes, and of Marshes. *Forest Land*—Government and Pastoral Rights. *Forest Economy*—Political and National. *Languages*—Italian, German and French.

The first year is mainly devoted to scientific training, and in the second and third years the practical details of forest management are taught. Tracts of land bearing evergreen and deciduous trees of various ages are set apart to be managed by individual students. In the nursery also, each has a division bearing his name where he may show his skill, patience and

fidelity in preparing the soil, sowing the seed, watering the plants, and trans-planting the young trees.

In Italy, Germany and France, the advice of the Government foresters is given gratuitously to all tree-planters, and the young trees are furnished from the nurseries connected with the Schools of Forestry at a nominal price far below the cost, in order to encourage tree-planting to the utmost. With all proprietors of forests, whether the State, the Commune, corporations or individuals, the Government enjoins first, what must be done in all cases, and secondly, sets forth what may be done, that is, what is desirable but optional. In certain localities, the owner must get the permission of the forester of his province before he may fell trees on his own grounds. If the interest of that province and of the country require the retention of trees on the mountain tops, the State compensates the owner of the land for any loss thus incurred, or the older and larger trees only are cut, and a continuous forest growth maintained. It is their theory that the forests belong not to one generation only but to all, and each is bound to leave them as good as it found them.

Schools of Forestry in Europe are of two kinds; first those designed exclusively for the study of forest science and its collateral branches, the *Forstakademie;* second the *Allgemeine Hochschule*, or the collegiate or polytechnic institution with a comprehensive course of study, of which forestry is one prominent department. Nancy and Vallombrosa are examples of Forest Schools, pure and simple. Carlsruhe and Hohenheim will illustrate the other class. "The Polytechnic" in Carlsruhe comprises six separate departments, viz: Mathematics, Engineering, Machinery, Architecture, Chemistry and Forestry, with a staff of forty-nine professors, lecturers, tutors and assistants. I was struck with the extent of the eleven "Collections" here provided to aid in instruction, including objects connected with forests; models connected with engineering, machinery and architecture, besides the usual botanic, mineral, and philosophic collections, and an arboretum or forest garden. Professor Meyer said that each of these departments really helps all the others, and the union plan proves the most economic and feasible, and that the two Professors of Forestry here by the aid of their associates accomplish results which require from five to seven professors in the isolated *Forstakademies.*

The Royal Wurtemburg Academy at Hohenheim is a School both of Agriculture and Forestry. Its immense edifice, formerly a summer palace of the Wurtemburg kings, is delightfully situated on very high ground nine miles from Stuttgart. Near the building is a fine park and experimental and botanic gardens, groves and an arboricultural nursery. The botanic garden covering over twelve acres contains some two thousand species and varieties of plants important in forest and naval economy, and an "exotic garden" of twenty acres specially adapted to forest botany. Near by upon the same mountain range is a forest district of about six thousand acres, embracing a variety of soil and of trees. The institution has an extensive collection of implements used in practical forestry, with models of machines and studies pertaining thereto; a museum of forest products, an herbarium containing over ten thousand species, and a very interesting collection of microscopic preparations more extensive than I had elsewhere seen, with a curious collection of pathological specimens, illustrative of diseased malformation and some seven thousand specimens of fruits and seeds. Great varieties of fine wood showing the texture and grain, are exhibited in the museums of all Forest Schools, but this is a remarkable collection of "microscopic specimens"—transverse sections of wood thin as the finest paper arranged in books as photographs are set in the spaces of an album. Held up to the light, these thin sections are translucent, almost transparent, and show the most delicate shades in the grain of the wood. Here is also a collection of noxious insects and all animals harmful to trees. The insects are shown in all their progressive states, as eggs, larvæ, pupa or chrysalis, caterpillar and moth, with their nests, and perforations in the stems or branches, and with samples of the trunk, bark, branch, root, leaf, cone or fruit, both sound and injured. For a careful comparison, the healthy and diseased specimens are placed side by side.

The curriculum fills two years, and in the forest department embraces among others the following topics: Forest Economy; History and Literature of Forest Economy; Forest Products, including Forest Botany, Sylviculture, Forest protection, Technical properties of timber, Uses of forests and forest technology; Forest administration including mensuration of trees and forests,

partition of forests for exploitation, valuation of forests and practical management of forests, forest excursions, "demonstrations" in different forest districts, Botanic Garden and Museum of Forest Products, cubic measurements of trees and cubic contents of woods, land surveying and levelling and mensuration of forests with theodolite.

For lodging and tuition, the students, if subjects of Wurtemburg, pay less than forty dollars a year, but foreign students are charged threefold more. Foreigners are admitted who pass the required examination and produce the "ticket of legitimation" from the proper authorities. Dom Pedro appreciates the national importance of forestry in Brazil. I was much interested in an intelligent and ambitious young Brazilian who is here training himself for a forest appointment in his native country.

A striking illustration of the influence of Forest Schools is found in the authorship of their professors and graduates. In the long run, the influence of any institution may be measured largely by the authorship which it prompts. Judged by this test, the Forest Schools of Europe have made a worthy record. By the coöperation of their professors and other writers, and sometimes of government officials especially commissioned to investigate different branches of the subject, the literature of forestry, already large, is now rapidly increasing. A German catalogue gives the titles of 1,815 volumes on forestry issued prior to 1842, and the titles of 650 works published in the six years prior to 1876. On an average, over one hundred new books on forestry appear annually in the German language. One of the Spanish Commissioners to the Centennial Exposition, Señor Morera, published a list of 1,126 volumes on forestry in the Spanish language alone. Director Bérenger of Vallombrosa has published over thirty books and pamphlets, among them one pronounced by Hon. George P. Marsh of great value on "The Absolute Influence of Forests on the Temperature of the Air." He also edits an able Journal of Forestry, "The Giornale di Economia Forestale."

The question has been much mooted in Europe of late, whether Schools of Forestry should be isolated, or connected as an additional department with existing universities or Poly-

technic or other institutions of a more comprehensive character. This was the leading topic of discussion at the last Congress of Foresters which was held at Freiburg in Baden, and attended by nearly four hundred members, representing all parts of Germany, also Switzerland, Austria and Russia. The leading German writers on forestry and the most prominent government officials in the management of the Crown and Communal forests were there. The President of the Convention was Dr. Nordlinger, the eminent Professor of Forestry at Hohenheim. The discussion, which was virtually a continuation of the debate begun at the Convention in Mülhausen the year before, awakened great interest and occupied six hours, the sederunt commencing at 8 A. M. and continuing, with an hour's intermission, till 3 P. M.

A brief summary of the leading arguments shows the feasibility of connecting a Department of Forestry with the Sheffield Scientific School. The discussion was opened by Professor Danckelmann, Director of the School of Forestry at Newstadt-Eberswalde in Prussia, defending the separate *Forstakademie*. He contended that Universities are designed to aid thorough investigations in the abstract rather than in the concrete. Though rich fountains of knowledge, they do not teach practical skill. The Forest Academies on the other hand keep the practical ever in view, and the attainment of knowledge is always combined with practice. Four things are essential; first, instruction in the technical work of forestry; next, in the management of forests; thirdly, in scientific research; and lastly, in the practical application of theories. Special schools are best fitted to secure these results. The *Hochschulen* are located far away from any forest, and the professors therefore are less acquainted with practical forestry, and the students, though more varied in their attainments, will fail to know thoroughly the things most essential for their profession; they will remain strangers to forests, and will not learn how to question trees; they may see cases of dead insects and yet learn nothing of the lives and habits of insects. To be a means of instruction, the forest must be a demonstration ground, and should be so situated that it can be visited daily without fatigue or expense. Though the University is the center of

culture and aristocracy, each of these is of secondary importance in the training in forest technology. The professors of the accessory sciences are out of sympathy with the forest, and busy themselves with problems irrespective of their relation to forest science. If it be said that the Universities have produced more eminent writers and thinkers than the forest academy, the remedy should be found in the academy and in the enlargement of its course of study, with opportunity for the student to resort to the forest every day, proposing and solving his questions on vegetable physiology and zoölogy.

The speaker appointed to open the discussion on the other side, Dr. von Seckendorff from Vienna, attributed the origin of isolated schools of forestry to the former state of forests, and the limited education required for forest service in a by-gone day. But now a more scientific method of research in forest matters has been introduced, and a higher testing examination is demanded of students in forest science. A liberal education is essential here as well as in the other professions. The advocates of separate forest schools claim two points of especial superiority; first, that their students are better trained in practical forestry, and second, that in these only are the studies conducted with due reference to the requirements of the forester. They assume that in the vicinity of the Allgemeine Hochschulen there are no forests suitable for the instruction of students, and that a purely theoretical education only must here prevail. These assumptions are unfounded.

The number of University and *Hochschule* towns in Germany, richly surrounded by woods is very great. In a line drawn from the coast of the German Ocean to the place of this meeting alone, there are Hanover, Göttingen, Marburg, Giessen, Heidelberg, Carlsruhe and Freiburg, all so surrounded. It is not the extent of a forest which decides its suitability as a means of instruction, so much as its variety of trees and modes of treatment and exploitation.

The second assumption will not bear examination. Science and practical work are not antagonistic to each other. In the Universities instruction does not go beyond what is desirable for every educated man. And there ought to be no ground for the suspicion that any students of forestry choose that depart-

ment because it makes the least demand upon them. Situated near railways, the Universities have the best facilities for forestral excursions and for fullest demonstrations in the field. As a matter of fact, the special schools do not turn out more practical men, and are not supplied with better districts for excursions, while on the other hand, in the *Allgemeine Hochschulen*, the instruction in the accessory sciences can be more complete and extended, and be given at no additional expense to the State.

After a long and spirited discussion by prominent professors from both classes of Forest Schools, the President, Dr. Nordlinger, desired those who were in favor of combining instruction in forestry with other departments in the university or *Allgemeine Hochschulen* to rise, when seemingly the whole assembly rose, which was followed by vehement applause. When those who favored the separate system were invited to rise, only sixteen members stood up. It will thus be seen that the result of the fullest and latest experience of Europe is in favor of organizing a forest department in connection with some existing collegiate institution.

INDUSTRIAL SCHOOLS.

No feature of the Educational Systems of Germany, Switzerland, Austria, Belgium, France and other European countries is more striking to an American observer, than the large number of Industrial Schools, specially designed to train apprentices and make skilled workmen and competent foremen. These schools are very numerous, and as various as the kinds of industry pursued in each country or province. There has been the greatest progress in manufactures in those countries where these schools have been maintained longest and most liberally. Geneva has for many years maintained a Horological School, and the Swiss watches have long been celebrated throughout the world. Last summer I visited the new Horological Institute then building in Geneva, a magnificent edifice to cost over $200,000, and also witnessed the work of the school then in its old quarters. The course of study and practice covers three years. There were seven instructors, who are experts both in the theory and practice. No one can graduate till he has proved his skill, again and again, by making an entire watch of standard excellence. The patient training of these classes, or rather of each individual member, in the minutest particulars, both in theory and practice, and the criticism of defects in the work done, illustrate the attention given to details in all Industrial Schools.

The same attention to minute details is seen in the Industrial School at Lyons, France, to which the preëminence of that city in the manufacture of silk is largely due. It has twelve professors, and the course of study occupies three years. Here, as in all Industrial Schools, a prominent study is drawing, drawing ornaments, tinted drawings, and sketching plans of machines from memory. Thorough instruction is given in every detail relating to the manufacture of textile fabrics, especially of silks, the natural history of silk, treatment of the silk worm and cocoons, spinning, throwing, weaving and testing of silks: sorting and cleaning: winding, warping and beaming: changing of looms for weaving different styles: defects in operations and their remedies: decomposition of tissues;

chemistry, especially as applied to dyeing and printing; physics with its applications to heating, steam-boilers, drying and ventilation; mechanics, embracing prime motors, materials and construction; hygiene, including physiology, noxious and useful animals, dangerous and unhealthy occupations, contagious diseases and how to avoid taking them; rural economy and "industrial plants." Manual exercises are conducted in the workshops in making, mending, putting up and shipping looms, in turning, filing, forging, fitting and various joiner's and machinist work. Frequent visits are made to the various factories in Lyons, under the lead of an instructor, where every part and process is fully explained. The students afterwards draw from memory plans of patterns and of machines.

About one hundred pupils on an average are in attendance. The regular charge for tuition, use of laboratories and workshops, is $140 a year. Indigent students are aided by the Chamber of Commerce and Municipal Council of Lyons, so that a portion only pay the full tuition. That this school, conducted without aid from the government of France, should be so liberally supported by the citizens of Lyons, and continue to flourish for so long a period, is ample evidence of its great usefulness in the opinion of the most competent judges.

More than sixty years ago France started special schools in the arts of designing, engraving and dyeing; in silk and ribbon weaving and lace making; in carving, stone-cutting and diamond-cutting (hence the diamond-cutting for the world is still carried on mainly in Paris); in porcelain and various ceramic productions, and the preëminence thus gained is still retained. The artistic manufactures of France command the markets of the world. The Industrial Schools more recently organized in Germany, Switzerland, Belgium, Austria, Italy and England, which in the aggregate are numbered by thousands, make these nations formidable competitors in artistic work.

When invited by the Minister of Public Instruction of France to visit the National Porcelain Factory at Sèvres, I expressed to him surprise that such an establishment should come under the supervision of the Educational Department, to which he replied, "It is because it is the duty of this department to supervise and control the Preparatory School for Sèvres, which

you should first visit." On inspecting this School of Design in Paris, I found in the lower rooms the methods and work of a first-class drawing school. But in the upper rooms the classes were painting on elegant goblets, cups, plates, vases and other choicer wares, just brought from Sèvres and to be returned there for baking. After witnessing this truly artistic work, I no longer wondered that in the Sèvres factory itself the artisan had indeed become the artist, and that only men of princely wealth could procure the products of this unrivalled establishment.

In Belgium the girls have shared the advantages of Industrial Schools as well as the boys. The schools for training in lace-making and embroidering, in Brussels, have long been celebrated, and kindred schools have more recently been opened in Rowlers, Ghent, Ath, Deerlyk and in many other places in that busy little kingdom. To those familiar with this fact, it was no surprise that Belgian lace shown at the Philadelphia Exposition was unrivalled. Some Industrial Schools are maintained wholly by the central government, others partially, and still others are supported by endowments, and many are private institutions dependent mostly on tuition for support. A large number called apprentice schools are maintained by benevolent associations. These are designed to train boys and girls both in skilled manipulations in various trades, and in the practical studies and theories most helpful in such pursuits.

Belgium, with about fifty industrial schools, and fifteen thousand apprentices graduated from them, Germany with over fifty-two thousand apprentices in fourteen hundred and fifty industrial schools, and France with twelve thousand industrial scholars, show the practical appreciation of these institutions in these countries, which distance the competition of surrounding nations in the great markets of the world. Steam and the telegraph are bringing all nations into such near neighborhood that industrial ascendancy will belong to that country which provides the best industrial education.

The Artisan School established nine years ago in Rotterdam, Holland, has already two hundred pupils and commands the confidence of that community. Candidates for admission must pass an examination in the simpler rudiments, and are expected

to remain in the school three years. The institution is both a school and a shop, and the time of the pupils is daily divided between the two. Drawing, Physics and Elementary Mechanics are prominent among the practical studies of the school room. In the shops a great variety of trades are taught, such as stone-cutting, including keystones, steps, thresholds, flooring tiles and placing plinths; masonry, including plain walls, foundations, chimneys, niches, sewers, arches, &c.; smithery, or making cramps, hooks, hinges, nuts, locks, girders, &c. The braziers are taught forging, turning, stretching and soldering, and make water-cans, dust-pans, kettles, basins, springs and various kitchen utensils. The instrument-makers learn to cut screws and worms, forge steel and copper and cast copper objects. The carpenters make chests, desks, trestles, windows, doors and the like. The painters learn to make putty, grind paint, polish wood, set glass, paint letters and to grain in imitation of marble or the choicer woods. In the Philadelphia Exposition the admirable exhibit of the various articles made by these boys proved alike their skill and the practical value of this institution.

In view of the great variety of the work and the need of individual instruction, twenty-one masters are employed in this school. Great prominence is given to drawing, as lying at the foundation of skilled industry. The Director is the teacher of construction and projective drawing. There are four other teachers of drawing—rectilinear, architectural, ornamental and model drawing, and one or more in each of the other departments above named. The boys draw simple constructions from wood, iron or brick work, such as window joints, doors, jambs, ravelins, stair-cases, roof-constructions, brace-works, springs, locks, cornices, architraves, &c. The school studies occupy each morning and the practical instruction in the workshops the afternoon. As soon as the boys are made familiar with the tools, they are entrusted with practical and marketable work, not sham or play-work, but the making of saleable articles for the trade, so that they at once feel that they are engaged in real business. This plan excites the ambition of the boys and adds interest and dignity to their work. The workshops are of the most approved kind and are supplied with the best tools and appliances. In the carpenter's shop, there are benches

with their appliances for eighty boys; and in the smithies are all needed forges, anvils, vices, benches, &c., for seventy boys. The directors, on whose authority the above statements are given, say, that on successfully completing their three years course, these boys receive considerably higher pay than those who have not enjoyed the advantages of the school.

Needle work forms a part of the course of instruction for girls in a large part of the elementary schools of Europe. In Switzerland four thousand three hundred and seventy-three females are employed in schools teaching needle work. In some schools I saw these teachers training their scholars in the use of the American sewing machine.

When one has inspected her technical schools and her twenty-nine industrial schools, he is no longer surprised that Switzerland is especially the home of industry, for her mechanics are educated and skillful. Though hemmed in by mountains, without a seaport, with few minerals and no coal, with costly transportation, all freight from the sea board coming over foreign territory, she threatens the ribbon trade of Coventry, rivals the English in muslin and delaine, and the world in watches and wood-carving. More than one million watches are made annually in Geneva and Neuchatel alone. The Swiss are an ingenious and industrious people. They believe in the dignity of labor and in the thorough mastery of some trade. In their industrial schools, prominence is given to drawing, designing and moulding, as well as to practice in the trades. Hence the world pays substantial tribute to Switzerland for the exquisite taste displayed in the decorative arts, their unequaled carvings, their beautiful chasings in gold and silver, their silk ribbons, their watches and music boxes.

The Earl of Rosebury says that the cause of this rapid progress of Swiss manufacture is plainly "the complete and *special* education which she gives in primary schools and *practical* schools, and *trade* schools, and secondary schools, and cantonal schools, all topped up by the great Polytechnic Institute at Zurich. The Swiss manufacturer is master of his business, and his workmen with whom he is in perpetual contact, respect him for this. Master and servant have been at the *same school learning their craft*, and they know it thoroughly."

Public schools, industrial schools and the Polytechnic Institute have in a remarkable manner unified and fraternized the people of these twenty-five cantons. Though separate in race, religion and language, they are one in national sympathy and interest, proud of their history, and prouder still of their recent progress and manufacturing prosperity. While beggars are found everywhere in Europe, there is less pauperism in Switzerland than in any other nation on the continent. With no communism, there is still a general diffusion of property, and almost every one is a land-owner.

In our country by reason of the restrictions imposed by our Trades Unions, apprenticeships are so much lessened that it is now difficult for boys to learn a trade. Hence increasing numbers are growing up to manhood in idleness, without any regular calling, or seeking to earn a livelihood without manual labor. This limitation of apprenticeships is a short-sighted and suicidal plan, sure to cripple our future mechanics. It seeks a temporary gain at the sacrifice of a permanent prosperity, and is depriving many boys of that thorough training in the several trades which is essential to their skill and success. The system of apprenticeship ought to be encouraged as an indispensable part of the practical education of our future artizans. Otherwise our youth must surrender the most lucrative positions to skilled mechanics imported from abroad. This waning of apprenticeships, which cannot easily be remedied, creates the greater necessity for industrial education.

In speaking of the substitution of steam power for hand labor, J. Scott Russell says: "Occupations which require no skill, but only brute force, will necessarily be vacated by human hands. Society, in the march of improvement, is as certain to do without the unskilled, unintelligent and uneducated as it is to do without wild plants and animals." Certainly any system of public instruction which leaves industrial education out of the account is radically defective. Fortunately this was the theory and practice of the early settlers of Connecticut. The founders of this State valued and honored industry. The code of 1650 which stood in this respect unchanged for over one hundred and fifty years required, "That all parents and masters do breed and bring up their children and apprentices in

some honest lawful calling, labor or employment, either in husbandry or some other trade, profitable to themselves and the Commonwealth, if they will not or cannot train them up in learning to fit them for higher employments." In 1683, Penn proposed the following resolution, which was adopted by the Provincial Council, "That all children within this province of the age of twelve years shall be taught some useful trade or skill, to the end that none may be idle, but that the poor may work to live, and the rich, if they become poor, may not want." How different would have been the history of Virginia and South Carolina, with their sunny climate and greater natural resources, had the founders of those States preached and practiced these sentiments which have been the source of the thrift, growth and prosperity of the North. Elizabeth Thompson well says: "Honest labor is the need of the hour, alike demanded by the physical, mental, moral and financial condition of the nation. Industrial education alone can bring about this reformation by joining with labor skill, dignity and honor." Industrial schools are now more needed than new colleges. "The danger is not of over education, with earnest aims and in the right channels, but of a genteel and lazy dilettanteism."

I have discussed this subject partly in order to invite the attention of wealthy men to its importance, and ultimately secure liberal endowments for industrial education. The extract from the will of David Watkinson, given below, and the liberal offer of one hundred thousand dollars by Hon. T. M. Allyn for the support of an industrial school in Hartford, show that this need has long been felt. If the Loomis Institute with its large endowment shall be devoted to the purpose of industrial education, it will meet a great and growing want, which no existing institution in the State attempts to supply. If the liberal offer of Mr. Allyn should be continued and accepted, it would be a nucleus around which other gifts would gather till the school should prove a great benefaction to the State. Such, at least, was the result of the donation of Mr. Boynton in Massachusetts.

The Worcester Free Institute was started by the gift of $127,000 by John Boynton. This beginning led Ichabod Washburne to consider the pressing demand for industrial

training, and he gave $130,000 to enlarge the resources of the Institute. Further endowments were made by Stephen Salisbury of $250,000, and by the State of Massachusetts of $50,000 giving a total endowment of $557,000. If the surviving members of the Loomis family carry out their present plan, the "Loomis Institute" will have double this endowment. Without even the semblance of dictation in the plans which they alone have the right to form, and with a grateful appreciation of the beneficent spirit they evince, I most respectfully suggest to them, and to other wealthy men who desire to become benefactors of the State, this means of meeting a great public need and erecting a lasting monument to their memory.

The following is the plan of the proposed gift of Mr. Allyn to the city of Hartford, some five years ago.

To the Mayor, Aldermen and Common Council of the City of Hartford:

The undersigned hereby offers to give to the City of Hartford the sum of *one hundred thousand dollars*, to be expended in the establishment and erection of an industrial school (under such rules and regulations as the authorities of the city may from time to time make), for the free education of both boys and girls in the business avocations of life, agriculture and the mechanic arts. The school should be a model, fashioned after our best ideal. It should possess ample grounds for an agricultural department, botanical gardens, and workshops, where all the principal trades may be learned. Every boy, at the same time he is acquiring a knowledge of the arts, sciences and modern languages, should become a practical agriculturist, or master some useful trade. The girls should be instructed in all the practical duties of the household, become familiar with the chemistry of the kitchen, and made to master the art of making any article of a lady's wardrobe, and also they may learn bookkeeping, banking, telegraphy, photography or any other occupation that is within the measure of their strength and adapted to their tastes. In this manner the education of the student would become a healthful exercise and a most fascinating amusement, instead of being (like the present system) destructive to vitality, exhaust-

ing the brain, and converting the school-room into an unattractive place little better than a prison.

It is believed that the amount proposed to be given will be sufficient for the purchase of the ground, erect suitable buildings and supply all the tools and apparatus required for the carrying out of the enterprise. The annual expense incurred of running the institution, after deducting the amount it would be entitled to receive from the school fund, should be cheerfully borne by the city. Should the proposition be entertained and the city accept the gift, it may be necessary to execute articles of agreement to secure the faithful performance of the trust assumed by the city.

T. M. ALLYN.

EXTRACT FROM THE WILL OF DAVID WATKINSON, WHO DIED AT HARTFORD, CONN., DEC. 13, 1857.

Codicil No. 11.

Article V. "Desiring to render a public benefit to the community in which I live, and to the State of Connecticut generally, by aiding in the establishment in the town of Hartford of a Juvenile Asylum and Farm School, for the family and school and industrial training of a class of children not now adequately provided for in any educational or humane institution: I do give and bequeath to my Executors the lot of land of about ten acres, surrounded by four streets, known as the Pavilion property, with the buildings standing thereon, and by me estimated to be worth the sum of $40,000 and in addition to said lot the sum of $20,000, said lot to be conveyed in fee simple, and said money to be paid over to Henry Barnard 2d, Edmond G. Howe, William L. Collins, William N. Matson, Henry Clay Trumbull, Daniel C. Gilman, Roland Mather, Newton Case, Alfred Watkinson, John S. Butler, Henry A. Perkins, Albert W. Butler, Edward Goodwin, E. A. Bulkeley, William D. Shipman and Austin Dunham, or such of them as may be living at the time of my decease, as Trustees for the purposes and uses herein set forth, viz:—to aid in the establishment and support of an institution for the relief, protection, instruction, reformation and employment of children between the ages of

six and twenty-one years who may be voluntarily entrusted to it for any or all of these purposes by the parent or guardians, or committed to its charge by competent authority.

Article VII. The institution designed to be established and aided by this bequest, is to be organized and conducted on the general principles and methods recognized in the Rauhen House near Hamburg in Germany, and the Agricultural Colony at Mettray in France, as described in Barnard's *National Education in Europe* (Edition of 1854), and in the Boston Asylum and Farm School, incorporated in its present form in 1833, and the New York Juvenile Asylum, incorporated in 1851, with such modifications as may be by the Trustees deemed to be better adapted to the peculiar condition of the people of this State, or which may be suggested by their own experience or that of similar institutions."

The amount of the Watkinson Fund is now $207,000. Of this sum $162,000 is invested in productive funds and $45,000 in land. The last sentence of the will gives the Trustees authority to make such modifications as they may deem needful for the industrial training of the inmates of the School. If industrial education becomes a prominent feature of the Institution, it will, in the words of the will, be "better adapted to the peculiar condition of the people of this State." The principles and methods recognized in the Rauhen House and Mettray School may be inferred from the following statement: The "Colonie Agricole," at Mettray, near Tours, in France, was founded in 1839 as an institution for the reformation and training of children liable to become vicious and criminal. Besides receiving instruction in the necessary school studies, they are taught various useful occupations, such as farming, and the trades of the wheelwright, blacksmith, joiner, carpenter, mason, shoe-maker, wooden-shoe-maker, tailor, rope-maker, sail-maker, etc.

The Reform School of the "Rauhen House," at Horn, near Hamburg, was founded in 1833. Here as at Mettray, the "family system" is maintained. The labor performed includes house-keeping and home-work, field and garden culture, and such occupations as shoe-making, making and mending clothes and bedding, carpentry and wooden-shoe-making, woolen-thread

spinning, baking, masonry and painting, house-keeping and basket-making. There are also workshops for printing, book-binding, lithographing, stereotyping and wood-engraving. The girls fill the places of servants, cooks, washerwomen, ironers, laundry-women and seamstresses. The younger girls help the older, make and mend coarse linen, knit and mend stockings, etc.

The German Government has long sought to make industrial pursuits reputable and universal. To this end, members of the royal family have practiced as well as preached the gospel of honest work. In Carlsruhe, I learned of an excellent girls' school in the *Schloss*, in which the Grand Duchess of Baden, the only daughter of the Emperor of Germany, had recently placed her young daughter, with instructions that she should be excused from none of the household industries required of the other pupils, that she should be trained in sewing and knitting, and made as thorough a seamstress as if she were to earn her livelihood by her needle. During her school life she is not to be distinguished by any of the high titles which she may bear in after life. In all respects she is to be on a par with her young companions, receiving no favoritism in view of her rank, but to WORK and play, run and romp, give and take on perfectly equal terms with her companions, and receive exactly the same punishments if remiss in study or work. The present Crown Prince of Prussia early learned the cabinet makers' trade, and at Babelsberg near Potsdam, the Summer Palace of the Emperor of Germany, are shown articles of furniture of superior workmanship made by him. His cousin, Prince Frederick Charles, learned the trade of glazier, and became quite artistic and enthusiastic in his craft. Fine specimens of his work may be seen in the Potsdam Palace, consisting chiefly of colored glass tastefully joined together by means of lead and tin strips, like the fine colored memorial glass windows so often found in churches. Such examples of honoring industry have exerted a vast and beneficent influence throughout the German Empire

EDUCATION AND LABOR.

The great majority of our pupils must work for a living. By the ordinance of Heaven, the necessity of labor is well-nigh universal. Nature and history alike confirm the old decree, "In the sweat of thy face shalt thou eat bread." Teachers and school officers should carefully inquire whether our schools are accomplishing all they ought to do for the working classes. It is a grand result that all are trained to read and write and cipher, and learn something of the other common rudiments. In no part of the world, except Germany, are there so few *native* illiterates as in New England.

The general intelligence of the people is one obvious cause of our exemption from the railway strikes of last summer. The sober second thought prevailed here, while madness ruled the hour elsewhere. But beneficent as has been the influence of the public school in New England, it has by no means done its whole duty to the laboring classes. More should be said and done to dignify labor and prepare our youth to become skilled workmen as well as industrious and upright citizens. It is a mistake to suppose that education need create any aversion to labor, or that those who do the roughest work need the least schooling.

Under the system of slavery in the South, and until recently with the serfs of Russia and the equally illiterate farm hands of England, it was held as an axiom that schooling would make laborers discontented, restless and unprofitable servants, and that universal education would render manual labor distasteful and disreputable. Too much of this mischievous legacy of slavery lingers among us still. The silly and wicked notion that labor is menial ought to be refuted in our schools, where our youth should be early taught the necessity and dignity of labor, as the primal source of all human excellence and progress. Girls as well as boys should be early taught both in the family and school that to learn to be useful

[illegible] Education should [illegible] instead of treating it as [illegible] labor and [illegible] true bearing of [illegible] youth [illegible] education [illegible] makes it more [illegible] fire- [illegible] his time [illegible] work accom- [illegible] tools or [illegible] Pride [illegible] and [illegible] best [illegible] other [illegible] drudgery [illegible] in

[illegible] The industrial [illegible] are [illegible] workman [illegible] of [illegible] elevate [illegible] workmen. The [illegible] brains help [illegible] and [illegible] knowledge is power. [illegible] What a man [illegible] stamps an [illegible] the humblest forms of [illegible] work depends upon the work- [illegible] improves his [illegible] work. You [illegible] by elevating [illegible] duals and Sta[illegible] fully secured or [illegible] sc[illegible] humb[illegible] wr[illegible] ings of [illegible] some cas[illegible]

tion to the next higher grade, and from that up to the highest or High School, and the programme is planned for those who complete the full curriculum, rather than for the majority who withdraw early for work or business. It is worthy of inquiry whether at each successive step the conditions of promotion may not wisely include the same studies and attainments which constitute the best preparation for the business of life, as well as for higher grades in school.

How to secure the best results with the least cost of time as well as money, is a problem not yet fully solved. Our text books, now too voluminous, should comprise less of minute details and more of practical methods and principles. Such topics in arithmetic as the least common multiple of common fractions, casting out of nines in multiplication and division, alligation medial and alternate, and commutation of radix, may well be omitted in a common school course, or briefly noticed in the appendix. Those and kindred topics, of no use in ordinary business, fill a large space in nearly all the arithmetics. They have a traditionary sanction. In continuing them the authors have consulted usage more than utility. Like the titled scions of rank in the old world, they have come down by so long a literary descent that no one disputes their right to their honored place. Worth more than all these complicated processes is the thorough mastery of the ground rules. In all our schools rapid mental combinations should be daily practiced till pupils can add, multiply and divide with the utmost facility and accuracy. This done, the rest of arithmetic will be comparatively easy and pleasant.

Ex-President Thomas Hill justly complains that our "Arithmetics have been expanded until the unfortunate pupil is lost in a wilderness of words, and does not find his way through, in time to learn to cipher. The science of arithmetic receives so much attention that the art is neglected. Life is not long enough to spend so long a proportion of it on arithmetic as is spent in the modern system of teaching it, and arithmetic is too valuable an art to have our children neglect to acquire facility in it, instead of being stupefied and disgusted with premature attempts to understand it as a science." It is certainly a useless repetition to require children to learn, for example, explana-

tions of the first principles of fractions, percentage and the like as they are scattered through four or five volumes, each successive series setting forth the same subjects only with greater fullness and complication. In many schools arithmetic is thus made a subject of study for eight or nine years, when three or four years ought to give the pupil the mastery of the essentials, including rapid mental combinations. He should learn the multiplication table early and thoroughly, and acquire great rapidity in all practical processes.

By the condensation or omission of too extended serial books in geography, grammar and arithmetic, and in the latter study mastering thoroughly only the practical portions and postponing the intricacies of compound proportion, permutation and the like, that not one in a thousand ever uses in the practical business of life, more time can be gained for reading, spelling, writing, the study and use of our own language, composition, at least in letter writing, and elementary lessons in the practical sciences, natural history, political economy, and the history of our own country.

WHAT BOYS ARE READING.

A timely appeal to the public has just been made, bearing the signatures of eminent citizens of New Haven who represent both political parties and the Baptist, Roman Catholic, Congregational and Episcopal churches. I welcome this warning, as I have had occasion to observe widely the pernicious influence of bad books and papers. Finding ten years ago that such papers as the *Boston Illustrated Police News*, the *New York National Police Gazette*, and *Day's Doings* were freely sold in the cars, I addressed a letter to the President or Superintendent of every railway in Connecticut asking if I might announce *authoritatively* in my next Report that "the sale of immoral papers is not permitted in the cars or stations of your railway." Cordial replies came promptly from the officers of every railroad of our State expressing their earnest purpose to do their part in the suppression of this great evil. One reply shows the spirit of all. "I fully appreciate your views and most heartily concur in your wish, and will do my utmost to prevent the circulation of such papers." Obscene books, papers and pictures are the worst of outlaws. The most indecent of this class are sold clandestinely. But there are others, sold openly, like those named in the following "appeal," which though less filthy, are more corrupting, if not more infamous than the most lecherous issues of the Parisian press. The poison which nauseates by an overdose, may be its own antidote. Professing to be illustrated histories of the week, these papers are in fact chroniclers of, or contributors to, the bar-room and the brothel. The safety of our youth now demands the utmost effort for the exclusion of such contamination. In behalf of the children of the State, I earnestly invoke the aid and coöperation of all parents, the officers of justice, the public press, and of all good citizens, in efficient measures for the suppression of the evil so well set forth in the following appeal and extracts from the paper of Professor Sumner.

hero of a story, but who also figures more or less in all of them. That is the imp of mischief,—the sort of boy who is an intolerable nuisance to the neighborhood. The stories are told from the stand-point of the boy, so that he seems to be a fine fellow, and all the world, which is against him, is unjust and overbearing. His father, the immediate representative of society, executes its judgments with the rod, which again is an insult to the high-spirited youth, and produces on his side, either open war, or a dignified retreat to some distant region.

These stories are not markedly profane, and they are not obscene. They are indescribably vulgar. They represent boys as engaging all the time in the rowdy type of drinking. The heroes are either swaggering, vulgar swells, of the rowdy style, or they are in the vagabond mass below the rowdy swell. They are continually associating with criminals, gamblers, and low people who live by their wits. The theater of the stories is always disreputable. The proceedings and methods of persons of the criminal and disreputable classes, who appear in the stories, are all described in detail. The boy reader obtains a theoretical and literary acquaintance with methods of fraud and crime. Sometimes drunkenness is represented in its disgrace and misery, but generally drinking is represented as jolly and entertaining, and there is no suggestion that boys who act as the boys in these stories do ever have to pay any penalty for it in after life. The persons who are held up to admiration are the heroes and heroines of bar-rooms, concert saloons, variety theaters, and negro minstrel troupes. From the specimens which we have examined we may generalize the following in regard to the views of life which these stories inculcate, and the code of morals and manners which they teach:

The first thing which a boy ought to acquire is physical strength for fighting purposes. The feats of strength performed by these youngsters in combat with men and animals are ridiculous in the extreme. In regard to details the supposed code of English brutality prevails, especially in the stories which have English local color, but it is always mixed with the code of the revolver, and, in many of the stories, the latter is taught in its fullness. These youngsters generally carry revolvers and

use them at their good discretion. Every youth who aspires to manliness ought to get and carry a revolver.

A boy ought to cheat the penurious father who does not give him as much money as he finds necessary, and ought to compel him to pay. A good way to force him to pay liberally, and at the same time to stop criticising his son's habits, is to find out his own vices (he always has some) and then to levy black-mail on him. Every boy, who does not want to be 'green' and 'soft,' ought to 'see the elephant.' All fine manly young fellows are familiar with the actors and singers at variety theaters, and the girl waiters at concert saloons. As to drinking, the bar-room code is taught. The boys stop in at bar-rooms all along the street, swallow drinks standing or leaning with rowdy grace on the bar. They treat and are treated, and consider it insulting to refuse or to be refused. The good fellows meet every one on a footing of equality—above all in a bar-room.

Quiet home life is stupid and unmanly. Boys brought up in it never know the world or life. They have to work hard and to bow down to false doctrines which parsons and teachers in league with parents, have invented against boys. To become a true man, a boy must break with respectability and join the vagabonds and the swell mob. No fine young fellow, who knows life, need mind the law, still less the police. The latter are all stupid louts. If a boy's father is rich and he has money, he can easily find smart lawyers (advertisement gratis) who can get the boy out of prison, and will dine with him at Delmonico's afterward. The sympathies of a manly young fellow are with criminals against the law, and he conceals crime when he can. Whatever good or ill happens to a young man he should always be gay. The only ills in question are physical pain or lack of money. These should be borne with gayety and indifference, but should not alter the philosophy of life.

As to the rod, it is not so easy to generalize. Teachers and parents, in these stories, act faithfully up to Solomon's precept. When a father flogs his son, the true doctrine seems to be that the son should run away and seek a life of adventure. When he does this he has no difficulty in finding friends, or in living by his wits, so that he makes money, and comes back rich and glorious, to find his father in the poor-house.

is only begun when his school days are ended. To complete it will be the aim and ambition of his life. Let his calling be what it may, with an insatiable desire for knowledge, he will find leisure for self-improvement. The many instances of self-educated men whose eminence and success are due to an early taste for reading, should be given to the boys who are just entering the active pursuits of life, and who are so apt to think that they can no longer find time for self-culture. But is the little leisure they have well improved? Should the evenings be idled away, because the days must be occupied with business or labor? The youth whose teachers have trained them to always have a good book at hand for odd moments, will enter the practical callings of life with a habit of inestimable importance.

WHAT SHOULD OUR BOYS READ?

Teachers can largely determine the reading of their scholars out of school. It is important not only to awaken a love of books, but to guide in their selection and form a taste for profitable reading. Scholars should be encouraged to have some good book always at home, in which they read a little every day. In school they should be invited to tell what they have read. To give an epitome of one's reading is an admirable school exercise. The pupil will peruse a book with ten-fold greater interest, when expecting to epitomize his author before the school. As a drill of memory and in language it is a most useful exercise, and is one that is sure to interest as well as profit the school. Having experienced these advantages in my own teaching, and witnessed them in many schools, I strongly recommend this practice, already adopted by some, to all the teachers of Connecticut. Instead of giving here a list of books for all the youth of the State, I advise teachers to recommend well known works in adaptation to the age, taste and advancement of individual pupils, usually those which they themselves have read, that they may the better appreciate and criticise the epitomes of the same by the pupils.

An eminent teacher recently asked a class of fifty-seven boys, What is the last book you have read? One answered "I haven't read any lately," another, "I don't remember," "can't tell" said a third. But the great majority were able to give an account of their reading, which was most creditable to their teacher, evincing his wholesome influence over his pupils outside of the school room. Twenty-seven had been reading works of history and biography, including Life and Times of Benjamin Franklin, Life of Prescott, Higginson's History of the United States, Irving's Washington, Lives of Cicero, Hannibal, Cæsar, Xerxes, Alexander, Ferdinand and Isabella. Three boys were reading Dickens' History of England and one was enjoying Bancroft's ten volume History of the United

school census then taken enumerated 574,693 children of school age, and needing elementary education. For these children only 262,259 school places were at that time provided, and there were 312,434 more children than places. Over two hundred new school houses have been provided since that date, and now the Board Schools and Voluntary Schools have accommodations for 505,323. The compulsory law has worked with little friction and marked success. As a result, there has already been a very considerable reduction in the cost of juvenile crime and pauperism. The magistrates of London and the Commissioners of Police have all borne cordial testimony to the fact that there has been a great diminution of juvenile offenses, and that every gang of young thieves known to the police has been broken up. The Superintendent of the Holloway Prison says the juvenile criminals have yearly decreased, so that instead of 136 males and 21 females admitted in 1869, the numbers for the last year were only 28 males and no females. In 1871, Hon. W. E. Forster, the father of the new educational bill, said to me, "In America you can have little idea of our difficulty in dealing with these myriads of street Arabs in London, who are so degraded and ignorant that they and their parents alike can appreciate neither the evils of ignorance nor the advantages of education." One of the inspectors now says, "These street Arabs sit side by side with the sons of industrious citizens, and so healthful is the tone of the school that complaints are seldom heard. These schools are of the deepest interest and first importance, receiving children from indigent and neglected homes, and supplying all that perhaps they will ever obtain of moral training and cultivation in head and heart. No one can continue to visit these schools and notice the sad state of these children at the outset without observing the gradual ameliorating effects of the care bestowed upon them."

By invitation of Sir Charles Reed, I witnessed in July last, the gathering of 5,000 of these children in Crystal Palace. The spectacle of so many children seated in ascending tiers in a semi-amphitheater near the great organ, was itself inspiring, and the grand choral singing, especially considering the brief period of their school attendance, was excellent. Besides the

feeling and social amenities are cultivated, should be encouraged.

The teacher cannot awaken love of books unless he himself continues to be a student. Any one who thinks he knows enough to teach even the humblest class, should never profane the school room by his presence. One who has ceased to be a learner cannot be a good teacher. The more one has discovered, the more he wants to know. The truly learned man feels the greatness of his ignorance and the littleness of his knowledge as but a drop out of the boundless ocean of truth. It has been well said, "the greater the circle of our knowledge, the greater the horizon of ignorance that bounds it. The pride of wisdom therefore is the proof of folly." Arrogance and assurance are not the fruits of true learning. Yet from the days of Johnson to Dickens "the school master" has been characterized in our literature as magisterial, opinionated and dogmatical. Associated as teachers are with beginners, or at least inferiors in attainments, seldom called to the grapple of mind with mind as in forensic contests with equals or superiors, there is great danger of imbibing the spirit of conceit and dogmatism, even when only getting deeper in the old ruts. What is dryer than an old, opinionated, self-satisfied, unprogressive school master? He despises "all your new-fangled notions." He glories in the "good old ways." His fluent routine feeds his complacency, though it really enervates his own mind and stupefies his pupils. Whoever either in the college or primary school has ceased to learn, should by all means stop teaching, for children need impulse even more than instruction. Any one who no longer thirsts for higher knowledge, cannot fitly lead even the youngest to its fountain. As a teacher, one must be progressive, or cease to be at all. The mind that stagnates must soon retrograde, and such a teacher would stultify rather than stimulate his class. Happily there are now many teachers worthy of their work, whose ideal is high, and who are enthusiastic in the life-long work of personal culture. The efficient coöperation of such teachers I confidently anticipate in the efforts now making to stimulate a taste for books, and aiding our youth in the selection of the best books. One who early acquires a taste for reading and a love of books, will realize that his education

trap of demagogues, would create a reaction, and therefore he did not ask for a general compulsory law. It was said, no matter what can be done in Prussia, or even in Switzerland, the people of England have too much independence, too much aversion to any semblance of tyranny, ever to submit to compulsory education. Mr. Forster now admits that he had no expectation that the town population would, to so great an extent, adopt the principle of compulsory education. Every town in England with 20,000 inhabitants, which has a School Board, has adopted it. The permissive provision for local compulsion was ingrafted in this bill with little faith that it would be ratified and applied in any of the large towns. But the people have surprised Parliament. In March last Mr. Forster said in the House of Commons: "Almost the entire *town* population of England is now under compulsory education. And there is no sign of reaction. If compulsion had worked with hardship on the people, nothing was so easy as to revert to the former state of things. If a motion were now made antagonistic to this principle of compulsion, *it would not have a single supporter in the School Boards of London, Manchester, Birmingham, or any other large town.* The school attendance in those towns where it has been made compulsory, has been improved 30 per cent. Leeds, for example, had almost solved the problem of getting hold of all the children. The attendance there has doubled by compulsion. The same has been done at Sheffield. At Stockport they had increased the average attendance until there were less than 2½ per cent. of the children between 5 and 15 who were not at school, and some of them were excusable on account of mental or physical inability. The right to compel a father to feed and clothe his child is admitted, and we have now arrived at a point of civilization at which we can declare that it is his duty to see that he is educated. The sole meaning of compulsion is that this is the duty of every parent, and that it is the business of the State to secure the performance of that duty, and if the parent is disabled by poverty, then to help him from local rates or imperial funds. It has been said, we must wait for public opinion. Well, public opinion has declared itself, for every town that by law was able to do so, has put the compulsory

system in force. The fact is, that the arguments in favor of compulsion are overwhelming, and Parliament should now make compulsion universal. It is admitted, you cannot extend compulsion without producing some hardship, and bringing a bitter pinch to some poor widow who depended on her children's labor. No great reform can be effected without cases of individual hardship, but in the long run these alterations would be productive of magnificent results for the whole population."

In Connecticut, the State Board of Education invite the coöperation of all parents and school officers in their efforts to promote the observance of the law for obligatory education. The gain in school attendance since the adoption of our compulsory law shows the wisdom and value of the enactment. This law has met the sanction of the people, irrespective of party or sect. The Labor Unions, convinced that it is specially fitted to promote the interests of the working classes, have repeatedly passed resolutions in favor of its rigid enforcement. Many poor parents have learned that their ignorance is one cause of their poverty and that, as education is essential to thrift and prosperity, ignorance should not be allowed to perpetuate indigence. We use the right to enforce mainly as an argument to persuade—an authoritative appeal to parental pride and foresight. We so press the advantages of education that attendance may be held a privilege rather than a legal necessity.

But when reason and persuasion fail, coercion stands in their stead. The law protects helpless childhood whose rights are sacred. It recognizes the claims of the humblest child to an education, as that which the State cannot neglect without detriment to itself and harm to a human soul. Not even by omission may the State doom a single child to ignorance and its manifold evils. The temporary hardships to families by loss of children's wages, occasionally incident to the observance of this law, will be counterbalanced a thousand fold by the permanent benefit of both parents and children, while its neglect would inflict lasting evil upon them and the whole community.

Attendance upon an evening school merely, or irregular instruction at home does not meet the demands of the law, which

requires that such instruction be regularly and thoroughly given.

Our law in regard to non-attendance applies not to manufacturers only, but to merchants, mechanics, farmers and all employers of children. The manufacturers, as a rule, cheerfully comply with the law. There is need of watchfulness in reference to the larger number who each employ one or more children in shops, or stores, on the farm or in the family. All persons who know of any instance of the employment of children under fourteen years of age, who have not attended school the time required by law, are requested to send information of such fact to the office of the State Board of Education, giving the names and location of the employers of the children and of the parents. A journey to the remotest part of the State will be amply compensated, if, thereby, a single child can be brought to school.

The needs of neglected children still occupy much time in public addresses and personal labors. The good results already accomplished furnish ample encouragement for the vigorous prosecution of this work. During the last year the agent of the Board has visited a larger number of families than in any former year. As the result of these visits to the homes of neglected children, nearly three hundred such children have been led to attend school. Nearly ninety-five per cent. of our children are now reported as in schools of all kinds—a larger percentage than in any other State in America, when the basis of enumeration is taken into account. In Connecticut, the enumeration includes all children between four and sixteen years of age. The gift from the State Treasury and School Fund of about two dollars and a half per scholar, ensures the fullest returns. In Massachusetts the enumeration is from five to fifteen. We discourage attendance under five, and the law authorizes towns to exclude all under five. There is, therefore, reason for congratulation on the efficient working of our compulsory law.

SCHOOLS AND COMMUNISM.

In 1868 a prominent plea against Free Schools was the argument that "the system is communistic in its principle and tendency. Establish free schools and you encourage a demand for free food, free clothes, free shoes, and free homes." Professor Faucett, liberal, fair and progressive as he is, urged the same objection in Parliament, saying, during the discussion of the new "Elementary Education Act," which was passed in 1870, "If the demand for free schools were not resisted, encouragement would be given to Socialism in its most baneful form."

Time tests all theories better than arguments. In Connecticut a decade of free schools has witnessed no new tendencies to Communism. The general intelligence of New England was one obvious cause of its exemption from the communistic railway conflicts in the summer of 1877. The sober second thought prevailed here, while madness ruled the hour elsewhere. The last election in Connecticut showed plainly the popular dread of the socialistic tendencies and dogmas, which were repudiated by both the leading political parties. In Massachusetts, where free schools have been maintained for more than two hundred years, there is as little Socialism as in any land in the world. Indeed, throughout New England, there is no tendency to Communism among the descendants of the genuine New England stock. The minimum that exists is limited to a small portion of the foreign element. Though curiosity attracted crowds to hear Dennis Kearney last autumn, it is due to free schools and the consequent intelligence of the people, that his communistic tirades disgusted all classes and prompted the candidate who first sought his alliance to disown his dogmas and disfellowship him.

I find among all classes, employers and employés, in the factories and on the farms, a growing distrust, not to say detestation, of Communism. The mad outcry of the Internationals, "Equality of conditions," "Capital is the enemy of labor," finds no response from the intelligent laborers of Connecticut. Thanks to our schools, they know that the condition of the

operative improves with the increase of industrial capital, which always befriends labor, when it multiplies the opportunities of education and profitable employment. Nothing helps the laborer more than that education which gives him both the desire and the power to better his condition, to improve first himself and then his home and household.

As a precaution against the communistic tendencies which now agitate and alarm Germany and other portions of Europe, and find here their fiercest advocates among the refugees thence escaped to our shores, the general principles underlying this subject should be studied by our teachers and presented in oral lessons in our schools. A few simple school talks on this theme might forestall much mischief in coming years. The intelligent workmen who by industry and economy are enabled to own their homes, however humble, or indeed to own anything, cannot be fooled by that insane crusade against capital, which really means wages without work, or which lets the lazy and profligate share equally with the industrious and frugal. The equality of conditions of which they dream, would be the low level of a common barbarism. Even enforced equality of wages lessens the motives to industry, skill and fidelity, and restrains the freedom of competition. Once applied, these notions would destroy not only capital but the motives and means of its future increase and protection. Destroy capital, and labor would suffer first and most. Capital and labor, therefore, are not enemies. It is only ignorance and prejudice that find any necessary opposition between the two. There should be kindness and sympathy between the employer and the employed. There need be no alienation between the rich and the poor. There should be no tyranny of capital over labor, nor hostility of labor to capital. The capitalist should fully understand the trials of the laborer's lot, and strive to ameliorate his condition, and the operative should know the risks, anxieties and conditions of success on the part of the manufacturer. There should be liberal pay on the one side, and fair profits on the other. The interests of both classes are bound together. If either one is harmed, the other must ultimately suffer. Certainly the laborer cannot long suffer in health, education or pay, without harm to the employer, and large losses

to employers inevitably extend to the operatives. They are copartners, and cannot afford to be antagonists. Capital is as dependent on labor as labor is on capital, and only as both work in harmony, can the highest good of each be secured. Indeed, labor is both superior and prior to capital, and alone originally produces capital. Many a penniless laborer, because well educated, frugal and industrious, has become an independent capitalist. Our most successful manufacturers have toiled up from penury to affluence. This aspiration may stimulate every one who is educated enough to combine skill with labor.

Communism is an exotic in this land. It does not easily take root in our soil, and the climate is uncongenial. Its chief advocates are homeless foreigners, even the immigrants long resident here have become so schooled by public sentiment and by our free institutions, as to be well nigh assimilated and Americanized.

Schools and the diffusion of property are our safeguards against Socialistic extremes. John Adams well said, "The ownership of land is essential to industrial thrift and to national security and strength and prosperity." Switzerland, with institutions as free as ours, is safe from Communism, for two reasons—the maintenance of free schools, and the general ownership of land. The Internationals may meet in free Switzerland, and nobody is frightened or disturbed by their vagaries. Germany has education, but not an equal distribution of land. Her vast standing army, consuming without producing, with its enormous expenses and exactions, has created a great revulsion of feeling among the people. The glory of conquest and the untold milliards of the French indemnity mainly expended on new fortifications and military equipments, do not atone for the mourning and bereavement brought to so many now desolate homes, the heavy burden of taxation, the dread of conscription, the fear of new complications and wars, and the inexorable demand that every boy shall spend three weary years of service in the camp. Myriads of families with boys approaching the military age, have emigrated to other lands to escape this dreaded conscription.

In France the home of Communism has always been in Paris. The horrors of the Commune in 1871 proved suicidal to the sys-

tem. Even Paris learned then a lesson not likely to be forgotten. But the great body of the French people, even then, had little sympathy with communistic doctrines, and to-day the French nation, with her 5,000,000 of land-owners, is strongly the other way. Here lie her strength and security. To illustrate the happy influence of this wide diffusion of landed property, Michelet describes a French peasant walking out of a Sunday, in his clean linen and unsoiled blouse, surveying fondly his little farm. His face is illumined as he thinks these acres are his own, from the surface of the globe to its center, and that the air is his own from the surface up to the seventh heaven. He is there alone—not at work, not to keep off interlopers, but solely to enjoy the feeling of ownership, and to look upon himself as a member of responsible society. Thus in all lands and among all peoples, "the magic of property turns sand into gold."

In the United States there are nearly 3,000,000 farmers with farms, averaging 153 acres each, besides a large number who own their dwellings and house-lots. These form the grand army of the Republic—each a volunteer, equipped and ready to strike down Communism, wherever its hydra head may appear. Let even the Socialistic leaders, whom Bismarck has banished, once learn here to till their own acres, and they will be converted to the true faith—of the sacred rights of property.

SCHOOLS AND PAUPERISM.

Ten years ago strenuous objections were made to free schools, as being a charity tending to pauperize the people, a kind of alms that no man could accept without impairing his manliness and self-respect. But they are now recognized as the people's schools by right, not favor, and prized as never before. Instead of being a charity, tending to demean and pauperize its recipients, all find themselves recognized as equal partners in the concern, having an equal voice in selecting the managers, in raising the funds, or in criticising the methods adopted. Thus the school is no more a charity than is the free public road or bridge. Help in schooling is really help towards doing without help—towards self-reliance. In Europe, those who express the greatest apprehension that the independence of the working classes would be destroyed by free schools, evince little desire to develop that genuine independence which true education fosters. In lands where the insolence of office is proverbial, they make it a prominent lesson to every child to "order himself reverently and lowly to all his betters, and to submit to the humors of my Lords." The people whose "independence" is so carefully guarded, are kept under various petty and vexatious restraints. Says Francis Adams, one of the most earnest advocates of free schools in Great Britain, "There is a large class in England, from whom we hear most about preserving the independence of the poor, who have always been opposed to measures intended to enlarge popular freedom. They find a personal gratification in the exercise of petty charity and the power to deal out to the working-classes little doles such as are provided for the remission and payment of school fees. Notwithstanding their homilies about parental independence and responsibility, they possess the spirit of patronage so long fostered by the social conditions of the country, which has done much to keep so many of our people in a state of miserable dependence and subjection. When their system of alms-giving can be carried on at the public expense, their zest is no doubt greater and they will not willingly surrender any

power which still has force to pluck 'the slavish hat from the villager's head.' This class now stands in the way of the complete realization of the free school system in England."

The vast pauperism of England, especially among the farm laborers, is largely due to the want of free schools. The facts and figures, both in regard to illiteracy and pauperism are appalling. The saddest sight to me in England strangely contrasted with her glories and beauties many and great, of which every Englishman is justly proud, was the low and wretched condition of her illiterate masses. Lest any just statement from an alien may seem exaggerated, I will quote from those to the manor born, for these facts from the lips of Englishmen, prove the evils of ignorance, if not the value of universal education. Rev. Dr. J. H. Riggs of London, who, in his zeal to prove our free schools a failure, quotes my description* of a few of our worst school-houses and poorest district schools, as if they were of *general* significance, and proclaims that ten weeks serves for the training of teachers in the Normal School of Connecticut, and that some of the schools of Maine are kept open but three or four weeks in the year, with kindred exaggerations and caricatures, unworthy of reply, and who finds almost everything English superior to anything American, is compelled to say, "English pauperism is a problem and a portent which seldom makes a due impression on an Englishman. Its monstrous character and dimensions are so familiar to us that they seldom strike us as monstrous. This vast and complex evil, this ulcer in the body politic, in its character and extent in this country, is absolutely a unique fact, because there is nothing comparable with it in the world besides. The number of persons annually in receipt of pauper relief is upwards of a million. The annual cost of poor relief is £7,886,724 (nearly $40,000,000). Abjectness and recklessness form the main element of the pauper's home. His cottage may consist of three rooms—the common room filled with litter and discomfort, and two bed rooms for all the inmates, parents and children, lads and lasses and often a male lodger, so that neatness and decency are precluded. Too often the cottage is even worse, a wretched double cell, where penury

* As found in several Reports of the Board of Education.

cowers, chastity can hardly survive, and female delicacy must be unknown, the house only a shelter, full of cumber and litter. Such are the homes of the majority of our English peasantry in the southern, western and south middle districts, and of many in most parts of England and in wide districts of Scotland and Wales. Such is the condition of the pauperized peasants, not as poets have painted, England's glory, but her reproach." Rev. James Martineau says: "The social discrepancies which disfigure and affect society have here assumed a monstrous and fearful character. Our country is a vast congeries of exaggerations. Enormous wealth and saddest poverty, sumptuous idleness and unrewarded toil, princely provision for learning and the most degrading ignorance, a large amount of laborious philanthropy but a larger of unconquered misery and sin terrify us with their dreadful contrasts of light and shade. It is appalling to think of the moral cost by which England has become materially great. Where is the laborer by whose hand the soil has been tilled? In a cabin, with his children, where the domestic decencies cannot be. I know not which is the most heathenish, the guilty negligence of our lofty men, or the fearful degradation of the low."

John Bright says: "Fearful suffering exists among the rural laborers in almost every part of this kingdom. What wretched, uncared for, untaught brutes, in helpless stolid ignorance, are the people who raise the crops on which we live, and what dirt, vice and misery in the houses where seven or eight persons of both sexes are penned up together in one rickety, foul, vermin-haunted bed-room—their wages reduced to the very lowest point at which their lives can be kept in them! They are heart-broken, spirit-broken, despairing men—reduced to such brutality, recklessness, audacity of vice and extreme helplessness that they have no aspirations to better their condition. Accustomed to this from their youth, they can see nothing in the future which can afford them a single ray of hope. As the rural laborer looks longingly up the social ladder of ranks, the first six or eight steps are broken out, and there seems to him no chance to span the chasm."

J. Scott Russell said ten years ago, "Something must be done, or our working classes will be grievously wronged and the

whole nation suffer. Poor England, standing by idle, is too late. Her workingmen, grown up uneducated, cannot now be educated, are too old to learn. They have lost a generation. Where was the fault? where the blame? Why did not our statesmen and aristocracy, already provided with special universities and schools for their own training, foresee that our trade was going away to more skilled nations, and warn us in time? The contrast between England and Switzerland is this; England spends more than five times as much on pauperism and crime as she does on education, and Switzerland spends seven times as much on education as she does on pauperism and crime."

It was in view of startling facts and statements like these from her own countrymen that England organized in 1870 an efficient system of public education. It is a striking fact that the latest statistics show a great diminution of both pauperism and crime. Instead of a million of paupers in 1870, the number returned January, 1878, was 726,000.* The cost of juvenile crime and pauperism has been remarkably reduced. The London Police Commissioners testify to a great diminution of juvenile offences and affirm that every gang of juvenile thieves known to them has been broken up. Even the adult population has been reached and elevated in some degree through their children. New hope and ambition have come to many an illiterate farm laborer, himself born to despair, by reason of ignorance born to helplessness and hopelessness, as he finds, though a thing unknown and undreamed of before, *his* children at school, and hence sees dawning upon them better prospects and possibilities than ever fell to his hard lot. The hopes cherished for children have thus cheered many a humble cottage.

In striking contrast to the depressed condition of the farm laborer in his own land it is interesting to see the picture of the New England farmer drawn by Rev. Dr. R. W. Dale, of Birmingham, in an address at Canonbury, England, January 17, 1879. When traveling in this country, he frequently expressed his surprise and admiration in view of the intelligence and independence of the farmers of New England.

* The unprecedented financial embarrassments now experienced in England will no doubt swell the next returns.

After remarking that for a century and a half the Puritan colonists had been left practically undisturbed by any foreign element, Mr. Dale proceeded to speak of the type of character which had been developed in New England and of the present social condition of the people. "From the 21,000 persons who, after five generations, were found in those States, descendants numbering at least four millions might be reckoned. At the present moment *no population on the face of the earth enjoyed equal prosperity. Wealth was more equally distributed than in any other community;* and the real and personal estate, liable to assessment, now averaged nearly £240 per head for the inhabitants, or £1,150 for each family, reckoning the family at five persons. The New England farmer had from the first adopted the belief that *the way to fight the devil was by the school and the church*, and that belief had been thoroughly and consistently acted upon. The influence of this vigorous race upon the United States, as a whole, had been immense. It was they who had been the great pioneers in the development of the resources of the country. It was they, chiefly, who had built Chicago, and who rebuilt it, after it had been destroyed by fire, with a quickness and splendor which rivalled the achievements described in the pages of romance. From the farm houses of New England had sprung many of America's noblest orators, most learned theologians, and greatest statesmen and philanthropists, and in the future the same people would contribute largely to the stability and greatness of their country. The history of these colonies, as contrasted with the history of other colonies, was an illustration of the true path of national greatness."

This remarkable contrast between the farm laborers of England and New England as described by English writers furnishes a demonstration of the economy and value of the school system so long neglected there and maintained here. The earnest appeals of Joseph Arch, John Bright, Dr. Dale and others in behalf of the farm laborers of England, have awakened general sympathy, advanced their wages, and ameliorated their condition.

NATIONAL SCHOOLS.

"Americans have no *National* System of Education," is the slur one often hears in Europe. To this criticism, my ready answer was, we need none and are fully determined to have none. The maintenance and control of schools has never been the aim of our National Government.

Our local independence and repugnance to federal interference and our complete State sovereignty in educational matters, is an enigma to Europeans, being in marked contrast to their traditions and usages. In England, for example, the School Board of any town or city may not select a site, build a school house, or prescribe the amount of a school fee without the sanction of the National Educational Department. But the complete decentralization of the American school system, though a point of weakness in European eyes, is, in fact, a prime source of its strength. The fact that our Schools are wholly in the hands of the people, supported by the funds they raise, controlled by officers chosen by them and responsible to them, is a leading element of their prosperity. Though certain bills lately introduced into Congress indicate that a few would welcome European centralization and control, the general public sentiment of the country has so long been growing in favor of the unfettered working of State systems, that this has now become our settled policy, which no lobby in Washington can change if it would, and should not if it could.

If a strong central government be essential for an ignorant nation, an intelligent people can govern themselves. In America, the success of schools in each State will depend upon the intelligence and consequent appreciation of its people. One of the worst legacies left by slavery is that of ignorance, and consequent indifference to schools, or rather of insensibility to the evils of illiteracy or to the advantages of education. Shall the admitted school destitution of the South, or of some new Western States, be promptly removed by federal agency, or more gradually supplanted by developing a proper local public sentiment. In the past, states and nations have been slow in

learning the lesson that alike to individuals and peoples, ignorance means waste and weakness, if not pauperism and crime, and that education tends to economy, thrift and virtue.

But there is a great acceleration in the working of moral and intellectual forces so that now in a decade, sometimes in a single year, are accomplished broader results than formerly in a century. The day for coërcion and dictation is passing. The growing assimilation and power of public sentiment is felt the world over. It has broken down the walls of China, the isolation of Japan, the serfdom of Russia, the slavery of America, and is now rapidly relaxing the grasp of tyranny even in that center of oriental despotism, Turkey. But nowhere else is public sentiment so supreme in its influence as in America, and never before has that sentiment been so strong in favor of the support of free public schools as to-day.

A striking illustration, both of the difference and power of public sentiment, was furnished more than a century ago by the replies sent by two American colonies to questions put by the English Commissioners for Foreign Plantations. The Governor of Virginia replied, "I thank God we have no free schools or printing presses, and I hope we shall not have these hundred years." The Governor of Connecticut answered, "One-fourth the annual revenues of the Colony is laid out in maintaining free schools for the education of our children." Accordingly, till after the late civil war, Virginia had no general public school system. Thomas Jefferson prepared with his own hand a bill for a free school system, of which he said, "By this bill, the people will be qualified to understand their rights and to maintain them, and to exercise with intelligence their parts in self-government. Provided for all children alike, rich and poor, the expenses of these schools will be borne by the inhabitants of each county, in proportion to their general tax-rates, and all this will be effected without the violation of a single natural right of any individual citizen." Jefferson caused the words, "Founder of the University" to be inscribed on his tombstone, but he placed a far higher estimate on free schools than on "superior education." Though defeated in this cherished plan, he defended it to the last, and said shortly before his death, "Were it necessary to give up

either the Primaries, or the University. I would rather abandon the last, because it is safer to have a whole people respectably enlightened, than a few in a high state of science, and the many in ignorance. The advantages of popular education are above all estimate. The objects should be to give every citizen the information he needs for the transaction of his own business, enabling him to calculate for himself and express and preserve his ideas, his contracts and accounts in writing: to improve by reading, his morals and his faculties: to understand his duties to his neighbor and country, and to discharge with competence, the functions confided to him by either; to know his rights and exercise with order and justice those he retains; to choose with discretion the fiduciary of those he delegates, and to notice their conduct with diligence, candor and judgment, and, in general, to observe with intelligence and faithfulness all his social relations. All the States but our own are sensible that knowledge is power. We are sinking into the barbarism of our Indian aborigines, and expect, like them, to oppose by ignorance the overwhelming mass of light and science by which we shall be surrounded. Surely Governor Clinton's display of the gigantic efforts of New York in education, will stimulate the pride as well as the patriotism of our Legislature to look to the reputation and safety of their own State, to rescue it from the degradation of becoming the Barbary of the Union and of falling into the ranks of our own negroes. To that condition it is fast sinking." How different would have been the history of Virginia had she heeded the wise counsel of this, her most eminent and far-seeing statesman? To the lasting harm of that State a different sentiment prevailed, so that as late as 1860, a leading Virginia paper said, "We have got to hating everything with the prefix *free*, from free negroes down and up through the whole catalogue, free farms, free labor, free society, free will, free thinking, free children and FREE SCHOOLS—all belonging to the same brood of damnable sins. But the worst of all these abominations is the modern system of free schools. The New England system of free schools has been the prolific source of the infidelities and treasons that have turned her cities into Sodoms and Gomorrahs, and her land into the common nestling place of howling Bed-

lamites. We abominate the system, because the schools are free." The long neglect of public schools so manifestly checked the growth and prosperity of the Old Dominion, notwithstanding her vast natural resources, and created so marked a contrast between her and other States far less favored in all the elements of material prosperity, that the logic of events has at last swept away these objections and converted old opponents to friends and supporters of free schools. At length Virginia rejoices in a free public school system. The progress of her public schools since the war is remarkable, accomplished in the face of prejudice, ignorance, and great financial embarrassments, for Virginia had her full share in the loss of over "three thousand millions of dollars sunk by the Southern States by the war," an amount larger than all the property of New England. To the question, How can schools be organized for the Southern States, without Federal aid or interference? the answer is, Look at Virginia, especially the schools of Richmond, Petersburg, Lynchburg, Staunton and Norfolk. Public sentiment there has been revolutionized. The common schools are growing in favor. Prejudice, opposition and penuriousness of course still exist, but are evidently waning. I inspected most of the schools of Richmond with as much delight as surprise, alike in view of the interest of the pupils, the culture of the teachers and the excellence of the schools. Private schools have greatly diminished and the children of the rich generally attend the public schools. Considered as the growth of eight years, the Virginia system is a most gratifying work. In the light of such facts, and in view of the rapid working of intellectual forces in this age and country, and the growing power of public sentiment, shall the most illiterate portions of our land be reached by *National* Schools supported by National aid and in any way controlled by a National Department? Shall the National Bureau of Education become a Federal Department, enlarged and authorized to organize and maintain a National University—or, with still greater expansion, empowered to establish schools and distribute the income from the sale of public lands, whether in proportion to existing illiteracy, school attendance, or the length and grade of the schools maintained?

Hitherto the National Bureau of Education has been simply advisory. It has, and it was intended to have, no authority. As an agency for collecting and disseminating needful information, it has already done great good, and promises to be still more useful in the future. But the attempt to organize a National University, support and direct local schools, or in any way interfere with State systems, would end its usefulness, if not end itself. Every true friend of this Bureau should protest against any such "enlargement of the field of its operations." The principle of State independence is too firmly fixed in the faith of all classes to brook any federal interference in school matters, even in the States or Territories most destitute and backward in education. In an ill-conditioned community like that in New Mexico for example, still Mexican in their traditions, sentiments and peoples, juxtaposed, but not blended with the heterogeneous elements of a swarming immigration from all parts of the country, not to say of the world, American ideas and institutions are yet in their rudimentary forms and earlier stages of development. Shall a Federal Bureau, at once in European style, *enforce* there its best plans of public schools, or leave them by a slower, surer, and more healthful process, to work out their own salvation? As the schools of every community answer to local public opinion, their success must depend on the sympathy and appreciation of the people. Public sentiment is a growth, not the creature of power made to order of any sort or size, as some have talked of "fiat money."

DECENNARY OF FREE SCHOOLS.

The free school system of Connecticut has now had a trial of ten years and is no longer an experiment. This "new law" was so radical in its character as to meet general opposition when first proposed in 1867. During the next year there was so great a change in public sentiment that it was enacted with great unanimity by the General Assembly of 1868. The struggle which this system had to wage for its existence is over, for it has been amply ratified by the people. The gauge of public interest is the increased burden of taxation which the people of Connecticut have chosen to bear, for school taxes are self-imposed. The amount raised by taxation for schools ten years ago was $628,152.12. The amount raised by State, town and district taxation last year was $1,252,248.63, or about double the amount reported in 1868.

The enemies of free schools have either been converted or learned the futility of open opposition. Dissentients are still found whose sympathy is needed to give the highest efficiency to the system. As the condition of the schools in each district answers largely to local public sentiment, the coöperation of every parent and citizen is essential to the fullest success.

A brief review of the history and results of the free school system furnishes encouragement to its friends, and presents facts fitted to satisfy the minds of all honest doubters. Convinced that the rate-bill was wrong in principle and harmful in practice I directed my earliest efforts, on entering the service of the State, to secure its repeal. During the session of the Legislature for 1867, the Joint Standing Committee on Education finally consented to recommend a bill for free schools, though with little faith in the measure and no expectation of carrying it. As the bill met no favor in either House, out of courtesy to its author, it was referred to the next General Assembly. During the next year the subject was fully discussed in numerous meetings in all parts of the State, the Secretary giving two hundred and six lectures on this and kindred topics.

thousands of children had been barred from school by the rate-bill, it was generally admitted that the results already attained proved the wisdom and necessity of the free system.

The Democratic State Convention, held in Hartford, January 17, 1871, unanimously adopted the following comprehensive resolution:

"*Resolved*, That the source of power being in the people, Free Schools and general education are essential to good government and the perpetuation of free Institutions."

The Republican State Convention, held in New Haven one week later, adopted a resolution equally strong in favor of free schools. Since that date, no opposition to the measure has been made or intimated in the Legislature. The subject of free schools was ably discussed by School Visitors in their Reports to their several towns. To give a single illustration of the strong and practical way this subject was brought home to the people in local reports in 1873, the able Report for Litchfield, written by Governor Andrews, then Secretary of the Board of School Visitors, said: "The argument in favor of free schools is short and decisive. Every person recognizes the duty of society to protect the *lives* of children. Our law protects the lives even of children unborn, for the reason that it is for the benefit of society that children should be born and reared. If, then, society may for its own benefit preserve the mere animal existence of a child, the obligation irresistibly follows that society must see to it that the life so preserved shall develop into a useful, intelligent and moral citizen, and not into a ruffian and a curse. The logic is impregnable; society should either destroy all children, or guide, protect and train them up to careful citizenship. Establish infanticide, or some system of free instruction. But the time for argument on the abstract question of free schools in our State is passed. As good citizens, we ought to use every effort that the system so inaugurated shall be successful."

In 1868, a leading objection to the system was its alleged tendency to lessen the interest and responsibility of parents. The natural argument was that men never value what costs them nothing. But the fact is, parents do pay, and all pay their fair and equal portion for the support of this central,

for her service, whether that shall be on the farm, in the factory, in the counting room or in the field of arms. It was really the better education of the North that saved the Union during the late civil war, as it was the ignorance of the "poor white trash" making them the dupes of demagogues that rendered the rebellion possible in the South.

In 1868 Governor English exerted his influence strongly in favor of free schools. In his annual message to the Legislalature he said: "The rate-bill should be abolished and the schools sustained at the common expense." In his parting address to the General Assembly of that year he said: "The measures which you have adopted to promote the interests of the people will meet with a generous approval at their hands. Especially will they thank you for the interest you have taken in the common schools. In adopting the free school system recommended in my annual message, I am confident you have taken an important step forward in the cause of education, and that your action in this regard will prove as beneficial in results as the motives which prompted it were free from political influence or bias."

As Governor English intimates, this new law was not in any wise a party measure. That a measure so radical should pass unanimously in the Senate and with only four nays in the House was more than its most sanguine friends expected: The press of the State was a unit in its favor. The leading men of both parties were its advocates. It is fortunate that on educational questions, men of all parties and all religious denominations meet on common ground and cordially coöperate for the common good. The platforms and creeds, which divide men outside, should never enter the common school—*common* because open to all, free to all; where no class distinctions are recognized and no favoritism is shown.

The law has received an emphatic ratification from the people. Two years later, when its influence in increasing taxation had been fully felt, an earnest effort was made in the Legislature for its repeal, which signally failed. Opposition and discussion helped this measure, as they always do any other which can bear close scrutiny and stand the test of experience. When the proof was placed before the people that

NEGLECTED CHILDREN.

This subject continues to claim attention. As the trend of the tide is here against us, to stem it requires constant watchfulness. Without effort, a backset would cover ground well nigh reclaimed. For, however well done, this is a work like that of a physician, that never stays done. Old cures will not stop the breaking out of new cases. In dealing with negligent parents our main reliance has still been kindness and persuasion, appeals to their parental love and pride, their sense of duty and their personal interest in view of the great importance of education to their children, and the rich privileges freely proffered them in the public schools. The same arguments have often reached the children, and thus they have gained a higher appreciation of the influence of the school upon their happiness, thrift and prosperity through life. Teachers as well as school officers may greatly help in this good work. It is the teacher's duty, or rather his privilege, to visit the parents of truant or neglected children, learn the causes of delinquency and secure parental coöperation. As I have urged this duty, a few teachers have asked substantially—"Is that in the bond," "what does the law demand?" as if the one ruling thought was—what is the minimum work I must do; but fortunately there are but few teachers whose theory and practice limit their duties and sympathies to the school house and school hours. On the other hand, a large proportion of our teachers, bent on doing the utmost good to their pupils, inquire into causes of absence from school, visit pupils in sickness, and thus often win the confidence and coöperation of parents otherwise captious or indifferent.

Among the causes of absenteeism is the want of proper clothing. In these hard times, while many willing hands are unable to find employment, this plea is by no means limited to the huts or haunts of indolence, intemperence and profligacy. Where parents are really too poor to provide comfortable clothing, the pressing needs of their children should enlist the sympathies of the benevolent. Here true charity may do as

truly Christian work as by any gifts for missions in pagan lands. That charity which really begins at home is at once most comprehensive and diffusive. Poor children have often been thus provided that they might attend the Sabbath school, and this effort is worthy of all praise, but even for morality and piety, thirty hours a week in the public school is worth far more than one hour in the Sabbath school. In some towns the Selectmen have met this exigency. While great caution should be used not to encourage indolence and improvidence, there are cases of destitution where town aid may be used as wisely to prevent starving the mind as famishing the body.

The fact that nearly ninety-five per cent. of our children are reported as in schools of all kinds, shows that the law for the prevention of illiteracy has worked beneficently and opened to hundreds the door of the school house otherwise closed to them forever. The influx of the foreign element suggests the leading cause of absenteeism. Those who need the most watching are of alien parentage, as yet novices in the English language, speaking chiefly a foreign tongue. There is also a large class of *native* children, whose parents, being illiterate immigrants, do not yet appreciate the advantages of education.

But four parents have been prosecuted and fined during the year. Instead of brandishing the penalties of the law, we have kept them in the background, and urged mainly the great advantages of education. These persuasions are, however, sometimes enforced by the delicate hint that we desire to avoid the painful duty of prosecution which must follow any and every case of willful and open defiance of the law. As will be seen by the following report, the prosecution of the employer and three parents in one town, resulted in promptly bringing seventy children to school.

It was a very gratifying fact that the superintendent of one of the largest factories in the State, after being prosecuted for the employment of children who had not received the required schooling, and being bound over to the Superior Court, should have the manliness to write to the Agent of the Board: "The legal measures you took were right and proper, as you used every other means in your power, and the law as the last resort. From this time, you may be assured, I shall use my

illustration than in the United States. If any people ever used this "power of education," or united its destinies to the development of its schools, or made public instruction the supreme guarantee of its liberties, the condition of its prosperity, the safeguard of its institutions, that is most assuredly the people of the United States. This role assigned to the school in social life has long been the most characteristic feature which foreigners have observed in American customs. This solicitude for the education of youth grows with the growth of the country, enters more and more into public opinion, and is incorporated in more decisive acts. What in the beginning might seem a burst of enthusiasm has gradually assumed the force of a profound conviction. No longer the work of philanthropists, or of religious societies, it has become a public service for which states, cities and towns include in their ordinary taxes sums which no country in the world had hitherto thought of consecrating to education. So far from restricting itself to elementary education, this generosity extends so as to provide free institutions of superior secondary instruction. Public opinion approves, nay, enacts these sacrifices, so clear has it become to all eyes that the future of the American people will be what its schools make it.

Many causes conspire to give the American school this unique importance. At first it was the influence of the Protestant element. The early settlers of New England knew of no grander duty, or more precious privilege than reading the Bible. Holding ignorance to be barbarism, they early enacted that each town shall have a school and that each family shall instruct its children. In proportion as their government became democratic, that which at first was only a religious duty became also a political necessity. Where everything depends on the will of the people, that will must be enlightened, at the risk of utter ruin. Education, useful elsewhere, is here essential. Universal suffrage means universal education or demagogy.

This country is peopled by the constant immigration of men of every race, class, and religion, who have little in common but the desire to better their condition. The mixed and ignorant crowds who form the bulk of this immigration tend to

FRENCH VIEWS OF AMERICAN SCHOOLS.

In 1876, the French Government appointed F. Buisson with six assistants, to examine and report upon the American school system. The Commissioners were all educational experts, connected with the Department of Public Instruction. They made a careful inspection of the school exhibits at our Centennial Exposition, and visited schools in various states from Massachusetts to Missouri. Repeated interviews with Monsieur Buisson led me to expect a most valuable Report from an observer of such culture, breadth and judgment, aided as he was by such eminent associates. This expectation has been amply met. Professor Swinton, who has translated a summary of this Report, fitly says: "We owe to a Frenchman the best statement of the philosophy of American politics. And now we shall have to credit to another Frenchman the best statement of the philosophy of American education. If this Report has not the monumental character of De Tocqueville's Democracy, it is by far the most comprehensive and the most valuable analysis thus far made of public instruction in the United States. It is our whole free school system, its organization, working, methods and results, set forth in its glories and in its faults, in its strength and in its weakness, by a critic as sympathetic as he is acute. By those who personally met the Commissioners, the Report of what they saw and what they thought of what they saw, has been awaited with lively interest. Well, we have at last after two years the *Compte rendu* of their mission embodied in a great octavo of some 700 pages, published in Paris under the auspices of the French Ministry of Public Instruction. The mere outlay that must have attended the mission and the publication of so costly a volume, enriched with plates, plans, etc., is a marked compliment to American education."

In condensing the following statements so as to read freely, I have modified the language of the writer for the sake of brevity. If the rhetoric has suffered, the thought is retained.

A republican government needs the whole power of education, said Montesquieu. This sentiment never found a fitter

for himself a stable and permanent position. Those who abandon it before obtaining their retiring pension form the exception. The young beginner expects to live and die a teacher, and as each year adds to his previous experience, the time comes when, possessed of adequate theoretical and practical knowledge, he is able to discipline his class methodically and successfully.

Not at all thus is it in the United States. The profession of teacher seems to be a sort of intermediate stage in one's career —a stage at which the young woman awaits an establishment suited to her tastes, and the young man a more lucrative position. For many young people, this transitory profession simply furnishes the means of continuing their studies. Few male teachers remain more than five years in the service; and, if the lady teachers show a longer term, it is not to be forgotten that marriage is usually the end of their desires, and that, once married, they almost always resign their positions. It has thus come to pass, by the mere force of circumstances, that the school authorities have been led not only to establish various regulations for the application of school laws, but also to lay down detailed courses of study containing the subjects to be taught in each kind of school, in each class, often in each division, and this for each term, if not for each month in the year. The time-tables in schools that are at all regularly attended are fixed in advance, the text-books are chosen by the school board; and finally, school manuals, often of great value, are furnished as a *vade mecum*, from which teachers may derive information as to methods and the various details of daily work.

Time-Tables.—A class in an American public school, even in the cities, comprises at least three divisions or sections, and in some classes with not more than forty-five pupils, five sections are found. But while in France it is a principle not to go beyond three divisions, and to bring these together as frequently as possible in collective lessons, such as reading, writing, history, geography, object lessons, and dictation—whereby these exercises receive the amount of time required for some degree of fullness in the development of the subject,—the American system rarely admits a combination of this kind. Each divi-

sion has its own separate lessons in the different branches, with an *occasional* exception in the case of oral spelling and object lessons. Thus in a session of two and one-half hours of actual work, we have counted in the primary schools and in the country schools as many as fourteen distinct exercises—a number reduced to seven in the grammar schools; but there is always one-half at least of the pupils that remain unemployed, while the others receive their lessons or go through their "recitation," as it is called in the United States. This everlasting coming and going of *study* and of *recitation* gives rise to a perpetual movement in the class-room.

Moreover, as monitors are never employed, it comes to pass that a very limited period of time can be given to the lessons, and even this time is diminished by the frequent changes of place, for generally, in recitation, the pupils leave their seats and arrange themselves standing, along the class-room wall, and then return to their seats during the fifteen minutes or half hour of "study," their place in the meantime being taken by others. In many a time-table we have seen lessons in reading, arithmetic and history reduced to ten and even to five minutes, and, in like manner, general lessons in botany and physiology cut down to five minutes in the first grade of a grammar school.

What is to be expected from such a procedure? It is in vain that the best arranged programmes are put into the hands of teachers, or that the most valuable pedagogic directions are laid down for their guidance—their intelligence and their devotion must both be foiled by the vices of such a system.

The time-tables—rarer, by the way, than any other documents—appear to us the weak part in the organization of American schools. There is nothing to indicate that most important matter, to wit, the work of those divisions which the teacher has not immediately in hand. The pupils are "studying," they told us, but what are they studying? Undirected and unwatched, we have our fears as to this "studying." Of course, there must be a great abuse of copying work, that mechanical task so justly proscribed in France; and worse still, it cannot be possible, owing to the lack of time, to develop the reasoning and observing powers of the children. Instruc-

tion, reduced as it is, per force, to dry recitations or mechanical exercises, is barren in the lower grades, where this evil is the worst, while in the higher grades it cannot but be fettered, and must produce results below what might be expected from so choice a body of teachers, and so excellent an organization.

School Manuals.—Every one of the various courses of study that we examined has joined to it, by way of complement, pedagogic directions for the use of teachers. Prepared, as these are, by competent persons, they bring the attention of teachers to the carrying out of the courses of study, the mode of conducting recitations and the nature and aim of practical exercises: in a word, they give the school system a unity that secures the regular progress of instruction, while it renders inspection more effective.

Country Schools.—Owing to the representations of certain enthusiastic travelers, a most lovely idea of the American rural school-house is common in France: it is pictured as a nest among flowers. Thither resort, each morning, on prancing ponies, red-cheeked lassies and lads, grave and proud and respectful to their young mates as our cavaliers of the good old times. The mistress—herself young—smilingly receives them at the entrance, o'ershadowed by great trees. How remote is the reality from this picture, this charming exception to a state of things still in its rude beginnings! We traversed the vast plains where the husbandman struggles against an unconquerable vegetation, and the still half-wild valleys in the regions of iron, coal and oil,—and it was not our lot to find any such school idyl.

In the country, stone or brick school-houses form the exception: frame buildings, so cold in winter and so scorching in summer, are much more numerous, and the log-house has not yet disappeared. In the most flourishing States, what complaints are made against defective school accommodations! Let it not be said that, in describing the rural schools of the United States, we have sought out exceptional cases: we have tried our best to do justice to that great country, but we cannot conceal the fact that in the rural districts the school-houses are poor affairs and poorly equipped. Thus in Pennsylvania and New Hampshire, out of twenty-two teachers' reports, fourteen

stated that the class-rooms were absolutely destitute of everything in the way of means for visual instruction, that is, there were neither maps nor blackboards; two schools had one map each; one school possessed an old globe; other schools no blackboards and no reading books; a single school was furnished with suitable apparatus.

The Courses of Study in Ungraded Schools are still in the tentative period, not to say in a state of chaos. Some are too succinct and barely outlined; others reflect the personal predilections of the teacher and show that ingenuous pedantry so often found associated with total inexperience. Sometimes a good deal less than the required course is done; sometimes it is greatly exceeded; such studies as history, music, composition, drawing and book-keeping being taken up, and in some cases algebra, physiology, geology, natural philosophy, and rhetoric even.

The worst evil from which rural schools suffer is irregularity of attendance. Teachers and superintendents bitterly complain of this. As a partial remedy, and as a means of allowing children to attend school without wholly depriving parents of their help, some States have lately established a number of "half-time" classes, in which attendance is reduced to a single session per day. This measure has everywhere been followed by good results, and it would perhaps be advantageous to introduce it into our French system, for the summer term at least, and in the case of the older pupils.

The Country School-houses are still in many instances built of wood, as are many of the finest dwellings, but they are frame buildings well put together, painted, and conveniently lighted. More frequently the constructions are of pressed brick with stone trimmings and slate roofs. You have only to see these coquettish school-houses, in the midst of vast lawns, shaded with fine trees and surrounded by palings, to judge of the place which the school holds in public opinion. It is indeed a national institution, devoted to the education of "boys whose votes will decide the fate of the Republic, and of girls, one of whom may be the mother of the president of the United States."

What specially distinguishes the country school-house of the United States from that of Europe is the absence of lodgings

for master or mistress. Nowhere in the United States is this arrangement found. It is an evidence of a state of things not without its unfortunate side: the teacher is engaged for a year simply; he is paid by the month, and most frequently his certificate has but a limited duration. Under these circumstances he but comes and goes; when he is not a resident of the locality, he takes board for the school term and has nothing but a study or office in the school-house.

School-houses of New York City.—In the school buildings in New York City everything is sacrificed to the reception hall with its vast platform, fitted to hold a desk, several arm-chairs and a piano. In the hall it is that the stranger visiting the school is received. The movement of five or six hundred children entering in good order, to the sound of the piano, from six or eight adjoining rooms, while the folding doors opening below, show the smallest scholars ranked on steps—all this makes a fine show: but it is purchased too dearly, if the studies and the health of the children are to suffer thereby, as we cannot but think that they must.

The Kindergarten.—Infant Schools, which in France precede the primary school, form no part of the public school system of the United States. The few infant schools which exist are private establishments, or else free institutions, without legal recognition. Nevertheless, since 1871, Kindergartens on the Froebel plan have been attached to some of the public schools of Boston and St. Louis, and these establishments are every year gaining ground in a quite marked manner in all the States. The obstacles still encountered by the Kindergarten arise partly from American domestic manners, and partly from the prejudice which this German importation arouses in the minds of certain superintendents.

Woman in America is much less employed than she is in France, Belgium, and England, in industrial employments that take her from her household. "Home, Sweet Home" is for the Anglo-Saxon a species of worship, and in this sphere the wife is to maintain order, peace and happiness, by attending to her husband and children. It is not to be thought of that she should go to a place of employment in the morning and stay there till evening. The hearth must not be cold nor the

house forsaken. And this is the motive that withdraws married women from public school-teaching. For what would become of her "home," and who would take care of her husband and children, when she was at school—generally considerably removed from her abode? In America the mother is the first instructor of her children, and generally she teaches them to read before sending them to public school.

In the Kindergarten exhibits at Philadelphia we noticed everywhere the application of Froebel's ideas, designed to interest children while amusing them, to excite and direct their attention, to accustom them to represent or put together objects of their own devising.

But with Americans the practical spirit is too strong for them readily to accept what does not offer an immediate result. One of the objections they urge against the Kindergarten is that it does not teach reading, writing and arithmetic (the three R's). Indeed, these institutions are not likely to meet full acceptance in the United States until it shall be shown that the general training they give to very young children will induce rapid school-progress, until it shall be shown that children bring from the Kindergarten a certain stock of practical notions. Besides, there is the question of expense, and how can $16 be gotten for the education of a child of from 3 to 7 years of age, when this costs only $10 or $12 for a pupil of from 7 to 10 years of age? If the Kindergarten has made its way at but a few points in the United States, it is the object of an active advocacy and has the sympathy of eminent educators. The application it has already received tends to free the Froebel system of any too exclusive form, and to adapt it to the wants and the genius of the country. This same result we should seek to attain in France, with the view of infusing life into our infant schools, and awakening the faculties of the child, instead of putting them to sleep by merely mechanical modes of procedure.

Reading.—The reading of the French language certainly presents sufficient difficulty; but the extreme complication and the numerous anomalies of English pronunciation render the teaching of reading in that tongue a still more delicate

problem. Hence, in the United States, great ingenuity has been expended in the discovery of practical and speedy methods. Germany has furnished many plans which have been ingeniously modified and applied.

The ancient alphabetic method is now scarcely used at all in good schools. It is the longest and most monotonous method —and it is the method best known in France. This method was not represented at the Exposition. Even in the country schools in the United States, there are not on the average twenty in a hundred that use the old spelling plan, and in many States it is not employed at all. Manifestly public opinion has pronounced for the new methods.

In the phonic method, imported from Germany, the teacher drills the child first in the pronunciation of the sounds of the language, then in distinguishing the signs by which these are represented. He thus proceeds from the sound to the symbol, from the letter uttered to the letter figured, in place of passing from the name of the letter to its phonic value, which is often very difficult. However, this method, applied strictly and in its whole scope, assumes that, as is the case of German, a given letter always corresponds with a given sound, and this is not the case with the English language. Hence many objections have been raised to the purely phonic method, which indeed had to be modified into the word method or the phonetic method.

The phonic method, even when aided by all the American improvements of the word method, will always meet with grave objections. Excellent for German and Spanish, in which a letter has rarely more than a single power, it encounters in French, and still more so in English, anomalies resulting from the constant use of the same sign for different sounds, or of two different signs for the same sound, not to speak of useless double consonants, silent letters, etc. This consideration has led to the invention, by Dr. Edwin Leigh, of a method based on the same principle, but which in its application has recourse to typographical innovations. In many schools the teachers make use of the Leigh method in connection with the word method, and this is called the *eclectic* method, for in America every new device assumes a pretentious name.

In most of the schools visited by us, special importance is attached to class exercises in pronunciation. The lady teachers throw a certain ardor into the work of articulation, and, if need be, they show the play of the vocal organs in the production of a given sound or element, as for instance *th* hard, or guttural *r*, etc. It is to be desired that this were done in France, and that our teachers appreciated the utility of this vocal gymnastic, as bearing on reading or even on spelling. No pains are spared to give the pupils a correct pronunciation, not only in the primary but also in the most advanced classes. The master reads in a loud intelligible voice a passage from the Reader suited to the grade. The pupils repeat it in the same tone and with the same inflections. This is one of the liveliest and most curious exercises in an American school, and one which we have often witnessed with the keenest interest. The preceding account proves what importance is attached to reading in the United States. The method employed, very generally a rational one, secures the speedy acquisition of reading, and inspires pupils with the love of reading; this is, doubtless, one of the reasons why there is no other country where people read better or read more.

(The two following recommendations to French teachers, drawn from the Commissioners' observations of American methods of teaching reading, merit the special attention of school officers and teachers of Connecticut). 1. *To render primary instruction in reading not only more attractive, but more profitable, by enlivening it by means of object lessons, and carrying it forward in connection with writing and rudimentary drawing.* 2. *To give more attention to pronunciation, delivery, emphasis, and expressive reading.*

The Mother Tongue.—The courses of study and the directions for teaching the English language reveal everywhere a truly practical spirit, and are full of judicious considerations. It is with entire justice that distinction is made between language training and grammatical study. It is readily understood that the English language, in which the laws of concord amount to scarcely anything, may content itself with this practical study. French, which deals more in rules and orthographic details, requires more attention to grammar.

Two abuses strike us in the numerous papers on grammar and analysis that came under our eye. 1. The complication of parsing and analysis. In France also we carry written parsing too far, for everywhere routine acts in the same way and transforms into a mechanical exercise what, within proper limits, ought to be a valuable intellectual discipline. 2. Subtlety of distinction and complicated terminology. In grammatical instruction it seems to the Americans that the simplicity of English syntax ought to be made up for by a lavish use of scholastic distinctions, which, unfortunately, correspond to nothing in the construction of language. Dictation exercises which occupy so prominent a place in our French schools, are rare in the United States.

A feature that deserves unreserved praise, and which we found in the better schools in the United States, is the development of the inventive faculty of the pupil by means of composition-exercises outlined in the most general manner. Even in the primary schools the teachers are beginning to require the pupils to write out an account of what is represented in a picture in the text-book or in a chromo placed before them. This is a capital exercise, and one that we cannot too strongly recommend for adoption in our French schools. The task consists simply in practicing the scholar in observing attentively, in telling what he sees, and in telling this in an orderly manner.

Geography has long been a favorite study in American schools. It could not be otherwise in a country that has so many reasons for devoting itself to this science,—the immense extent of its territory, the great diversity in its physical conditions, resources and population, the importance of its commercial relations with the whole world, not to mention the circumstances of its origin, whence it results that no land is absolutely foreign to it.

In response to a well understood want, geographical instruction early assumed a methodical form: this form, without being original, has still an American character, something national and *sui generis*. The old mode of instruction, bristling with repulsive nomenclatures which in nowise spoke to the mind or the imagination, and which merely loaded the memory, is still doubtless found in a multitude of rural schools: for in speak-

ing of the United States in general, it must never be forgotten that there is a distance of nearly half a century between the country school, properly so-called, and the town or city school.

One of the happiest symptoms that strike the attention at the slightest examination is that geographical study now almost always begins where it ought to begin—*by making the child acquainted with the neighborhood, by a plan of the class room, the school-house, the street, the village;* in a word, a knowledge of the points of the compass, not merely on the map and as a matter of definition, but in nature, in a given locality. This very fact is an indication justifying the belief that geographical reform has penetrated deeply into educational practice, for it is generally by such beginnings that this reform ends. It is more difficult to bring about a rectification in the manner of teaching these rudiments than it is to perfect subsequent instruction. And that this progress has been made in the United States is manifest in every way,—by the text-books, the courses of study, and the numberless specimens of work done by the scholars. The strong point in all this new geographical training is that it is really a series of object lessons, that it begins with the child's own stock of knowledge instead of overwhelming him with abstractions and definitions.

Without overlooking the progress already made, we received the general impression that the new methods have not yet penetrated into the heart of primary teaching; they are known and applied sometimes in an admirable manner in the larger cities and in *élite* schools, but they are still unknown in most country schools, and between these two extremes are thousands of schools which as yet have hardly begun to feel the influence of the new ideas, and thousands that have the letter without the spirit thereof. The following features of American geographical teaching are recommended as worthy of imitation:—

I. *To begin with the synthetic method, which, starting with local geography, progressively enlarges the horizon of study, but not to dwell too long on local geography; to give pupils notions of general geography and cosmography as soon as they are able to receive them.*

II. *To practice pupils early in map drawing from memory and in reproducing on the blackboards the proximate forms of countries.*

III. *To insist on the descriptive part, without going out of the way to seek the picturesque, and paying particular attention to imparting correct ideas on the relief of countries, their general features, the nature of the soil, climate, production, etc., above all, great attention to what the English call "physiography."*

Arithmetic.—In American schools nothing is equal to the care with which the child is trained in the intelligent application of the four ground rules. No sooner does the pupil know the simplest numbers, 1, 2, 3, that is the *a b c* of calculation, than means are found for setting him to work in combining them by addition, subtraction, multiplication and division, in such a way as to bring into play all the faculties of attention, reflection and judgment. Beyond this first stage, the teaching of arithmetic generally quits the good way we have indicated, and ceases to be the supreme agency of intellectual culture. It seems as though the sole aim now were to impart hastily the practical means of resolving this or that kind of operation.

The principles that might light up the progress of the pupil and exercise his wits are almost voluntarily left aside. He commits to memory how, in a given case, he should state a proposition, what rule he should follow—whether or not he has learnt the *why*—and he applies the rule, with confidence and in a routine manner to exercises similar to that which served as an example. Practice before theory—such is the idea that generally prevails. And the method of proceeding is generally as follows: The teacher, or one of the most advanced pupils, sets forth on the blackboard each point in an operation to be learned, while the pupils follow, verifying in their book the course indicated; then the latter reproduce on their slates the same work, retain the rule by heart and apply it, point by point, to new examples. The rationale of the procedure is given only in case the curiosity or good sense of the scholar calls it out.

Great efforts are now making to bring back arithmetical teaching to a more rational way, to ally in just measure theory and practice, by a recurrence to the principles of analysis as well as of synthesis. By the solution of a good many problems of the same kind, dealing with quite small numbers the pupil is led to formulate for himself the method to be pursued

in the exercises assigned to him. His memory is then not the only faculty brought into play; he reasons and draws conclusions; his good sense develops, he acquires correct language, acquires a taste for what he does, and gains strength for greater difficulties. Arithmetic has its principles and its axioms, just as geometry has, and it is by setting them forth, by developing them logically that the pupil's intellect is sharpened and his judgment exercised and himself fitted for the intelligent practice of calculation. [The following American methods recommended to French educators, need to be more generally applied by our teachers.

I. *To prepare children for the study of arithmetic by the use of the abacus, without prolonging this exercise too much.*

II. *To extend the use of mental calculation, as well in the form of operations carried on in the head as in that of the rapid solution of such problems.*

III. *Not to be afraid of practicing children from an early age in mental calculation, fractions, complex numbers, the metric system—the whole presented not in the rigorous and definitive order of ulterior instruction, but under the common, elementary, analogical, and, so to speak, provisional form suited to a first survey of the subject.*

Drawing in the Public Schools.—Six years ago drawing was taught only in certain special schools, and that in a very imperfect manner: there were no models, no methods, no materials, no masters. A committee was formed, and in a few years a whole system of instruction was devised. In some states, Drawing has been made obligatory; four methods, strictly graded and completing one another, bring the arts of designing within the reach of pupils of all ages; public expositions are increasing; all regular teachers are put in the way of teaching this branch of education; a normal school of art, to which flock pupils from all parts, has been founded and a fruitful emulation has arisen among various cities. If we take into account that these are the fruits of a few years of trial, it must be acknowledged that such remarkable results were never before obtained in so short a time. The following are the recommendations made on the subject of drawing:

I. *To commence drawing as soon as the child enters school, by slate or blackboard exercises, using the aid of squares or better style*

of points regularly placed in such a way as to leave to the pupil the drawing of the lines.

II. *To advance gradually from the straight line to elementary geometrical figures, then to more complex combinations, and so to industrial and ornamental drawing.*

III. *Especially to practice the eye by elementary studies in perspective, by the recognition of distances by sight, and by the observation and comparison of forms.*

IV. *To proscribe drawing by mere fancy or chance, which falsifies the taste.*

V. *To organize for pupil-teachers methodical courses of drawing suited to their future wants.*

High Schools. — Everywhere High Schools are the special object of attention on the part of School Boards and towns having over 500 families—say from 2,000 to 2,500 inhabitants, do not shrink from taxing themselves for their suitable accommodation. In most cases, these schools are for both sexes. No part of the American school system is more essentially national than are the High Schools, no part of the system presents features that are more original, or, in some respects, further removed from European ideas, no part of the system is worthy of more profound study. Peruse the course of study in these High Schools; think of those children of workmen and work-women passing four or five years in adorning, strengthening and cultivating their minds by studies that everywhere else are reserved for the well-to-do classes, and tell us if these institutions do not bear the very seal and impress of American civilization. Need one be astonished, then, at the frank pride with which the American citizen speaks of these schools? Has he not a right to be proud when, by sure documentary evidence, he shows us the son and the daughter of the humblest artisan so mentally elevated that between them and the privileged of fortune no difference of culture, no trace of intellectual inferiority, is to be discovered? If it is glorious to see society freely giving to the poor the benefit of a public school education, is it not a still more extraordinary spectacle to behold a nation that deems it would wrong its humblest citizens were their children denied *any* opportunity for the full and free expansion of their minds? Here is a country where

there are hundreds of free High Schools, on the same footing as the most primary establishments. They are of one body with the common schools, are administered by the same authorities, supported by the same funds, and intended for the same population; and yet, instead of being limited to the strictly essential studies, to the minimum of knowledge required to take children out of the official category of the illiterate, these upper schools are established on the basis of what may be called the higher instruction. They are not professional schools, nor are they bastard imitations of the classical college, nor yet low grade universities—they are in the fullest sense popular schools, intended to give the people the best, purest and loftiest results of liberal education. They open up no special pursuit—they lead to all pursuits, without exception and without distinction. They do not make an engineer, an architect, or a physician, any more than they make an artisan or a merchant, but they form bright, intelligent youths trained to studies of every kind, qualified to select for themselves among the various professions, and skilled to succeed therein. One graduate will enter the university, another will go into business; there will be differences of occupation among them, but there will be no inequality of education.

So far as social equality can possibly be reached on this earth, it is attained by the American High School. In other countries it is to be feared that the children of different classes of society, though brought together for a while in the public school, must soon find themselves separated by the whole distance between their respective families; indeed, it must be so, since one child enters on his apprenticeship and thus stops short in his intellectual development at the very time when the other is just beginning his. In the United States every effort is made to delay and to diminish this separation, to carry as far as possible, and as high as possible, that common instruction which effaces the distinction of rich and poor.

If it be true that the prosperity of a republic is in the direct ratio of the replenishment of its middle classes, of the abundance and facility in the indefinite recruiting of these classes, then the High School of the United States, whatever it may cost, is the best investment of capital that can possibly be made.

[Of the conclusions reached by the Commissioners, the following are the most practical and suggestive to Americans.]

Summary of Conclusions.—1. The common schools of the United States are essentially a national institution; they are dear to the people, respected by all, created, sustained and enriched by a unanimous spirit of patriotism which for a century has shown no falling off; in a word, they are deemed the very source of public prosperity, as, *par excellence*, the conservative and protective institution in their democratic government and republican manners.

2. The school organization is rigorously municipal. The law simply establishes as a principle the necessity of public instruction, leaving to each community to provide for its own needs in its own way.

3. The higher direction and the inspection of the public schools are confided to elective boards. From this peculiarity arise various results, as, for instance, the frequent renewing of the Boards and Superintendents, the unfortunate influence of political prejudices and local interests, the liability to sudden changes in the school organization, and, finally, *the necessity imposed on the people to keep themselves informed on school questions, as matters on which they have constantly to vote.*

4. The public schools are in all grades absolutely FREE: the abolition of fees was in every State the signal of the new birth of the public schools; it brought into these establishments the children of all classes of the population, and constantly tends to bring them nearer and nearer together.

5. The public schools are absolutely unsectarian.

6. Compulsory education, made matter of law in some States, has doubtless aided the development of common school instruction. The results thus far ascertained are not very striking; and besides it is impossible either to pass or to carry out the measure in the very region where its urgency is most pressing, that is, in the South. In general, the most practical form that compulsion has assumed is the hunting up of vagabond children or the adoption of various measures to force them into school, to begin with, and then, if need be, to transfer them to reform schools or other special establishments.

7. Public school instruction in the United States does not

form a course of study apart, strictly limited to a minimum or completely distinct from classical instruction; it comprises three degrees—the primary, the grammar school, and the high school course—sometimes combined in a single school, and again subdivided among three different schools, but in all cases *connecting with the higher education*, whether literary or professional, so that a child of the working class has the opportunity of gratuitously continuing his education as far as his tastes and aptitudes permit.

8. The training of teachers is now almost universally regarded as the essential condition of sound, popular education, and the number of State Normal Schools is rapidly increasing.

9. As the career of teaching is often taken up merely provisionally by young men or women who do not intend to continue in the field, there results a very grievous instability in the teaching force—though it should be observed that there is some compensation for this evil in the fact that it draws into the work a large number of young schoolmasters full of ardor, equipped beyond the needs of the common school course, and untrammelled by the spirit of routine.

10. The coëducation of the sexes is the rule in the American public school system, and except in some of the great cities is becoming more and more the rule. The results of this usage are generally represented as excellent in both the moral and the intellectual aspect. The only or at least the chief objections heard, are based on the excess of labor which the system imposes on young girls.

11. From these causes and from the marked taste of Americans for innovation and new departures, it has come to pass that the schools of the United States show a diversity of organization, and a multiplicity of forms, courses of study, textbooks, and methods, which result in much experimentation and a lamentable loss of time; but which, by leaving a great deal to the free choice and responsibility of teachers and local authorities, interests them directly and personally in the success of the school.

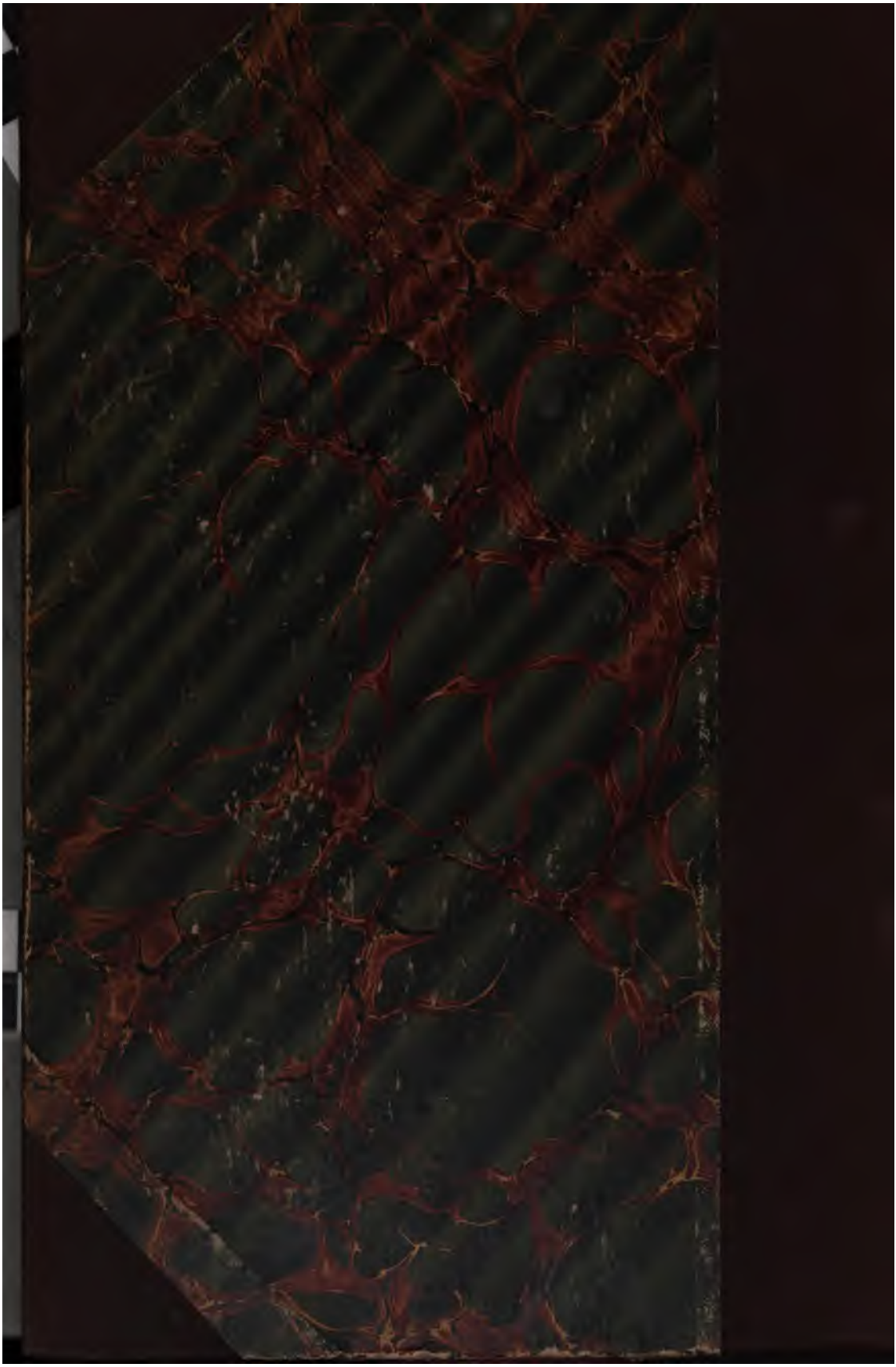
12. Thence result, also, extraordinary efforts and boundless liberality directed to giving the schools, both in the construction of the buildings and in the establishment and maintenance

of the institutions, an air of comfort, of amplitude, and almost luxury, which is not merely a satisfaction to municipal pride, but is mainly the means of giving the public schools the prestige necessary to bring within their fold all classes of the population without distinction.

13. The great publicity given to the Reports of Committees and Superintendents, the interest taken by the people in school statistics, and the beautiful and simple organization of the National Bureau of Education do more for the growth and improvement of educational institutions than could possibly be accomplished by the *orders of any administrative authority*, even though clothed with the most extensive power.

14. If, with all these educational facilities, the United States still show a considerable proportion of illiterate population, the explanation is found, first, in the fact that the whole South is yet a region to be conquered for public school instruction, and secondly, because immigration is incessantly bringing in a fresh contingent of illiterate adults.

15. The educational methods of the United States are in general distinguished from our own by two characteristics, which may by turns be either advantages or defects. On the one hand they tend to become essentially objective, synthetic, analogical, active. On the other hand, they are eminently practical, being planned and practiced with reference to the wants of life and to direct utility.

16. And so in the choice of subjects to be taught, the American system is marked by the selection of the most indispensable matters, of the most rapid methods, of the most positive successes, of those advantages which if not the most important for mental improvement, have the most direct bearing on the present or future interest of the pupil,—an aim which is very well in principle, but which, when too exclusively sought, stamps study with an empirical and utilitarian impress, gives a narrowness to education, and to a certain extent cramps the mind itself.

17. As regards methods of teaching, the American system recommends itself by a frequent appeal to the pupil's own powers, to his intellectual and moral spontaneity. It cares less for the logical order of ideas than it does for the natural order of